

# Types of impact of knowledge brokering organisations: evidence from the UK what works centres

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In recent decades, organisations brokering evidence to decision-makers have multiplied worldwide. However, insufficient attention has been placed on examining their impact on policy and practice. This paper investigates the impact of a specific set of knowledge brokering organisations in the United Kingdom (UK) called What Works Centres (WWCs). Using a framework of knowledge brokering impact developed with brokers, alongside forty semi-structured stakeholder interviews from four Centres, we analyse the different types of impact that these organisations have. We find that WWCs have reframed the debate on issues (conceptual impact), impacted on decision-making at different stages of the process (instrumental impact), helped stakeholders access, monitor and use evidence (capacity-building impact), and created opportunities to discuss what works and improve practice (relational impact). We also highlight instances where impact was not achieved, illustrating to knowledge brokers what could be done differently. We contribute to research and practice by empirically documenting the variety of impacts of knowledge brokering, focusing on the voices of those they are seeking to influence. Our framework which outlines different impact categories of knowledge brokering and evaluation tools can be used by practitioners in academia and beyond.

**Keywords** knowledge brokering, impact, evidence, public policy, practice

## 1. Introduction

Organisations that broker evidence to policy and practice, called knowledge brokering organisations (KBOs) (Mackillop et al. 2023) or evidence intermediaries (Gough et al. 2018), have been introduced by governments around the world. Knowledge brokering (KB) involves high transaction costs (Cash et al. 2006) meaning that it must be effective if people and organisations are going to invest resources. Despite being focused on ‘what works’ and aiming to generate impact, little is known about their performance. Demonstrating impact in this field is difficult, notably to attribute specific impacts to KB activities. It is nevertheless crucial for organisations to show their utility to policy and society and secure future funding.

There is a substantial amount of research on knowledge brokers as individuals acting as intermediaries between evidence and decision-making<sup>1</sup> (Norton et al. 2021). Research on organisations is less plentiful, especially outside of health and environmental studies (Mackillop et al. 2020; Mackillop et al. 2022; Vallance et al. 2025, see also Jensen-Ryan and German 2019). The work these organisations do varies with significant differences in their size, scope, funding, target audience, aims, ways of working, knowledge brokering techniques, and activities. This paper explores two research questions about these organisations. First,

we ask what types of impact do KBOs have? There is debate in the KB field about how to define impact, how this differs from pathways to impact, and how definitions may vary across organisations (Reed et al. 2018, 2021). We develop a framework, informed by research and discussed with brokers, that categorises four types of impact: conceptual, instrumental, capacity-building, and relational. The latter two impact types are especially relevant to KB and tend to differ from research impact. Our second research question asks how the impact of KBOs can be evaluated. Multiple methods have been developed to evaluate the impact of (usually) research and in some cases KB interventions on policy and/or practice (Bornmann and Marx 2014, Pedersen et al. 2020). Many of these frameworks are resource-intensive, so there is need for more light-touch approaches, especially for those working in the field.

We use data from forty interviews with people in decision-making roles across the United Kingdom (UK) who interacted with four UK What Works Centres (WWCs). Rather than focusing on KB activities, we concentrate on the effect of those activities and the relationships that KBOs have built on decision-makers and their organisations. We ask those that WWCs are trying to influence to ‘judge the outcomes’ of those activities ‘in their own contexts, against their own criteria and values’ (Reed and Rudman 2023 p. 971). By comparing cases from different sectors—geographical and policy areas—we gather views on the different types of impact that brokers can have.

What Work Centres are arm’s length brokering organisations aiming to bridge the gap among evidence and policy and/or practice (Sanders and Breckon 2023). WWCs combine aspects of

<sup>1</sup> We use the term ‘decision-makers’ to refer to people working in policy-making and other decision-making positions in practice. We would, for example, include teachers and police officers as ‘decision-makers’ under this definition.

both think tanks—with their proximity to decision-making—and academia—with their approach to evidence. There are currently nine WWCs and three affiliates which are part of the What Works Network (Cabinet Office 2024). These organisations generate, synthesise, communicate and help to implement evidence on a topic. Some centres focus on a geographical area whereas others are targeted on professions or on wicked problems—complex social issues such as homelessness that are difficult to address (Mackillop et al. 2023). These organisations also work with evidence bases which are potentially more contested than evidence often mobilised in the health sector, and where there is disagreement and competition over what counts as evidence and what works.

Our research contributes to the literature on KB impact by presenting a framework developed with brokers reflecting the myriads of impact that organisations can have. We add to the seminal works of Weiss (Weiss 1977) and Nutley and colleagues (Nutley et al. 2007, Meagher et al. 2008, Morton et al. 2012) by focusing on the impact of knowledge brokering which is often distinct from research impact. We find examples of impact that go beyond the commonly used measures of citations in policy documents and delivery of training courses. Examples of missed impact opportunities are also highlighted. Building on existing research and practice, we present a menu of potential impact evaluation tools for knowledge brokers to use.

We begin by reviewing the existing literature on our two main research questions before outlining how the research was conducted. Our findings on the different types of impact of WWCs are then presented and analysed. Finally, we discuss those findings and draw conclusions and avenues for future research.

## 2. Literature review

We reviewed the literature on our two research questions—the types of impact knowledge brokering organisations have and how this impact can be evaluated.

### 2.1 What types of impact do knowledge brokering organisations have?

This question is particularly important when comparing the impact of KB with research impact, where there has been a tendency to focus on tangible impacts evidenced by citations in policy documents (Haunschild et al. 2025). In some cases, KB impact and research impact overlap, particularly in engaged and transdisciplinary scholarship where research production and use are more closely integrated (Hudson et al. 2023, Meadow et al. 2024). However, in our view, and with our focus on KBOs, KB impact is often distinct from research impact. Specifically, KB places greater emphasis on the processes, relationships, and activities that occur between the production of research and its eventual use by decision-makers.

Existing scholarship on KB impact tends to focus on the activities of individual brokers working in defined organisational settings, often in the health sector. The impact of brokering by organisations is less researched (Mackillop et al. 2023, Vallance et al. 2025) with some exceptions such as a meta-synthesis of case studies examining the impact of boundary organisations on environmental issues (Jensen-Ryan and German 2019).

Our review of the literature suggests that reported impacts can be organised into four categories. First, instrumental impact includes influence on policy and practice (Burns et al. 2022); improvement in knowledge and skills (Dobbins et al. 2019); or examples such as new patents (Berbegal-Mirabent et al. 2012). Here, documented impacts tended to be limited to direct/formal examples such as providing evidence reviews in a rapid format to decision-makers or legislative impact (van Kammen 2006; Jensen-Ryan and German 2019.). Practice impacts included changes in how practitioners used evidence, such as the development of new evidence-based guidelines for community nurses (Gerrish et al. 2011). The creation of two-way partnerships with stakeholders was also mentioned as an example of practice impacts (Newman et al. 2020).

Second, conceptual impact included impacts on behaviours and attitudes between decision-makers and other evidence users and led to culture change (Dobbins et al. 2018, Wye et al. 2019). Third, existing research documented capacity-building impact, which included capacity-building and skills development (Moore et al. 2017); changes in knowledge (Combs et al. 2022); and better access to and skills in networking (Wye et al. 2019). For example, this may include strengthening the evidence base on a topic by identifying and synthesising relevant information or by supporting the development of analytic and interpretive skills (Bornbaum et al. 2015).

Finally, a relational impact of knowledge brokering was also reported, which included any impacts related to networking such as increased network ties, network density and development of partners' networks (Cvitanovic et al. 2017). Bornbaum et al. (2015) highlight the importance of identifying, engaging and connecting key players and facilitating collaboration. Edwards and Meagher (2020) also find a relational type of impact that they call 'enduring connectivity' which focuses on the two-way exchange between brokers and evidence users. This last relational impact, albeit one of the least mentioned in the literature, seems especially relevant to our interest on KBOs. Cvitanovic et al. (2017) found that the broker added benefit by being able to build better connections with and among key players and helping users by developing their individual networks and improving how they engage with key people *via* guidance and training.

The impact of knowledge brokering also manifested at different levels, including individual and organisational levels. Regarding the individual level, KB impact included impact on individual skills, such as learning to write policy briefs (Waqa et al. 2013), capacity to use evidence alongside expertise (Yost et al. 2014) behaviours (Ward et al. 2009, Traynor et al. 2015, Karcher et al. 2025), changes in knowledge such as what individuals saw as evidence (see also for individual level impact Currie and White 2012; Kislov et al. 2017, or changes in awareness regarding a certain issue (Langeveld et al. 2016).

At the organisational level, impact is reflected in how organisations make decisions, how working patterns and schedules are organised based on evidence (Sarkies et al. 2017) and in encouraging the creation of a culture of evidence (Cameron et al. 2011). Barry et al. (2019) found nine sources where organisational outcomes had been achieved by brokers with an increased volume of clinically relevant, practically applicable research and increased application to improve care. In one case, brokers had been permanently brought into the organisation's decision-making (Waardenburg et al. 2022). A randomised control trial

(RCT) of KB approaches in three organisations (Traynor et al. 2015) reports how organisational capacity was enhanced by KB with the establishment of a ‘train the trainer’ mentoring model for staff to become KBs, a committee set up to increase awareness, knowledge and behaviour for evidence-informed decision-making (EIDM), and an accompanying manual for doing EIDM. Although a focus on the organisational level is important, Jensen-Ryan and German (2019) argue that the impact of knowledge brokering depends less on organisational structures than on processes, interactions and contextual factors that shape how organisations operate.

Our review of the literature illustrates the diversity of KB impacts reported, the dominance of studies in health, and a focus on individual brokers.

## 2.2 How can the impact of knowledge brokering organisations be evaluated?

KB is difficult to evaluate because it is a complex phenomenon with multiple processes and actors, taking place in contexts with varying factors at play (Martin et al. 2025). Studies methodically and robustly evaluating KB are still few (Bornbaum et al. 2015, Boaz et al. 2019) because of these difficulties. A recent systematic review of research-policy engagement initiatives noted the existence of 1,923 interventions by over 500 organisations worldwide, the majority of which were not evaluated (Oliver et al. 2022). The research field is suffused with evidence on developing theories and models for evaluation, but empirical evidence on the impact of KB is lagging (Ziam et al. 2024).

There is a vast literature examining the impact of research (Meagher and Martin 2017, Pedersen et al. 2020, Budtz Pedersen and Hvidtfeldt 2024, Ataci et al. 2025), with innovative approaches such as network analysis (Oancea et al. 2017). These approaches are often difficult to adapt to KB which is situated among research, policy and practice, and means that the activities, processes, outputs, outcomes, and impacts will differ from those of research. Knowledge brokers, and especially KBOs, work in different ways to researchers. They engage with evidence that includes but is not limited to research evidence, crafting their own interpretation of those evidence types and mobilising that information for purposes beyond academic agendas, recognition and promotion.

A scoping review of 88 articles which evaluated knowledge mobilisation (the wider field that includes knowledge brokering) finds almost half of them are theoretical with no empirical testing and 80% focus on health (Ziam et al. 2024). The dimensions of knowledge mobilisation evaluated include context (internal and external), process (planning levels, implementation mechanisms, and characteristics of the strategy), effects (assessment of outcomes following implementation, at different timescales), and impacts (ultimate effects on end users, e.g. improved population health). The effects dimension was the most often evaluated, whereas the other three dimensions were often mentioned but not evaluated. This could suggest focus on contact with evidence/brokering rather than use. They also find that only a minority of studies evaluated knowledge mobilisation targeted at informing or influencing decision-making (14% of 88 sources reviewed) or targeting decision-makers (9%), most evaluating capacity-building strategies focused on education and professional training for practice improvement (52%). This illustrates the difficulty of evaluating impact, with most research focusing

on effects rather than impacts, and a dearth of research on KB’s impact on decision-making, which is the primary focus of our study.

Different models and approaches are used to conceptualise the impact of brokering, with process models, such as the Knowledge to Action framework, being most popular (over a third of studies reviewed), followed by evaluation frameworks (just under a third) (Nilsen 2015, Ziam et al. 2024). Logic models were often mentioned in the empirical studies we reviewed, with brokers establishing a theory of change with inputs and outputs and then determining a set of evaluation tools. Determinant frameworks, usually originating from implementation science such as PARIHS (Promoting Action for Research Intervention in Health Services) were also often used by research based in health (Newman et al. 2020). These frameworks focus on barriers and enablers to implementation of interventions.

Empirical studies of KB impact are usually conducted by those who had delivered the KB intervention and mobilise specific tools such as interviews (Mc Sween-Cadieux et al. 2019), satisfaction surveys (Dagenais et al. 2015), focus groups, workshops and observations (Wathen et al. 2011), contribution stories (based on Mayne 2012), and pre- and post-intervention questionnaires (Bornbaum et al. 2015). Counting instances such as event attendees, downloads, views and citations of outputs, or number of meetings with decision-makers was often cited as a way of evidencing impact, as this is a low-resource and routine activity (Maag et al. 2018). At the other end of the spectrum of resource requirement, RCTs were also used (Dobbins et al. 2009). Scarlett et al. (2020) document 174 indicators for evaluating KB, combining counting with other more qualitative indicators such as level of engagement and increase in trust, however it is unclear how those softer and more informal impacts should be evaluated. Maag et al. (2018) also provide a long list of potential indicators for evaluating the impact of individual brokers, although the focus is on process (what the KB is doing). This means that most of those indicators rely again on counting, with the risk being of missing the informal impact of behaviour and culture changes. Another limitation is that many of these indicators rely on self-evaluation by KBs, instead of involving the KBs’ stakeholders.

Our review of the literature illustrates how the topics of interest are currently researched. This analysis shows that there is room for more research that examines the different types of impact that KBs can have, using a framework that can help to focus on these types. We discuss how we developed our approach in the following section.

## 3. Methods

Given that WWCs have received significant investment from government stakeholders, philanthropy, and other bodies, it is important to understand their impact (Breckon and Sanders 2023). The cases were selected to facilitate comparisons of organisations using similar and different models and tools in diverse contexts. The Centre for Homelessness Impact (CHI), Education Endowment Fund (EEF) and What Works Wellbeing (WWW) all focus on specific issues, whilst the Wales Centre for Public Policy (WCPP) examines a wide range of policy issues that are devolved to Wales (Mackillop et al. 2023, supplementary file; see also Martin 2025 for tables comparing WWCs). EEF works with a specific profession—teachers and school leaders—whilst the others work with an array of professions. EEF is perceived as

being one of the most impactful centres (Edovald and Nevill 2020), whereas WWW ceased to exist in 2024. Our case selection also allowed us to look at knowledge brokering organisations working with and/or seeking to influence multiple organisations in a complex system, whereas most KB research focuses on individual brokers in a single organisation.

We conducted interviews with audiences of each KBO rather than relying upon the self-reporting of knowledge brokers on their impact, which is often the case in existing research (Durrant et al. 2024). Forty semi-structured interviews were conducted with evidence users working in government (UK and devolved), local government, practice (e.g. teachers) and third sector organisations. Interviewees were asked ‘to elucidate their perceptions as to whether the knowledge broker did in fact have a positive impact’ (Cvitanovic et al. 2017: 258). There is significant learning for these case study organisations through hearing from the research user perspective (Woolley and Molas-Gallart 2023), but there is potential for wider lessons to be drawn for different types of KBOs internationally. The cases could provide learning for what is happening in other countries such as Clearinghouses in the USA (Gersten and Hitchcock 2009), and Productivity Commissions in Australia and New Zealand (Banks 2011). We also interviewed two experts working in the wider field of evidence and policy to get their perspectives on the impact of WWCs. A table listing interviewee details is available in Appendix 1. The research received ethical approval from our university’s Research Ethics Committee.

Interviewees were selected after analysis of WWC documents and using our existing knowledge and networks. Interviewees were also asked to recommend additional participants. After conducting twenty interviewees, the authors discussed emerging findings and used purposive sampling to recruit other participants from sectors where the WWCs were active. This helped in achieving a balanced representation of different views on the impact of each WWC. Interviewees were informed at the beginning of each interview of the confidentiality and anonymity clauses and were encouraged to be as critical as they wished.

To explore interviewee’s perceptions of WWC impact, the topic guide was composed of three sections which reflected our review of the literature and impact framework (see Table 1 below for the framework). The first section focused on understanding the interviewee’s (and organisation’s) view on evidence, allowing us to explore the culture of evidence in different organisations, and to understand what individual and organisational factors might influence evidence use. The second section asked about the different types of impact that the WWC might have had, covering the four types in our impact framework and encouraging interviewees to outline any other types of impact. The final section of the topic guide examined the role of context on impact. Questions built on research examining the impact of a public health intervention on policy-makers in Australia (Newson et al. 2021). The interview data produced nuanced understandings of the impact of these KBs, with multi-faceted responses that combined positive, and negative examples and cases of no impact.

The interviews were recorded, transcribed, and coded, using NVivo to help draw out themes. The first, inductive, stage of coding followed the themes outlined in our interview questions described above. Further themes emerged during this stage. Authors 1 and 2 met regularly to discuss respective codes, any disagreements, and refine final themes and codes, with Author 3’s input. All authors

participated in discussing the relevance of our two key themes in line with the interview data and the literature.

As members of one of the case study organisations and part of the KB community, it was crucial to be reflective of our own positions during the research. The risk of bias—towards our own organisation and our peers—is always present. We mitigated this in three ways. First, our author team functions as a separate entity to the rest of the KBO, where we have regular conversations about our independence, position, and biases. Second, Author 2 was new to the organisation and to the subject matter and this helped to bring a fresh perspective on how we designed the study, collected data, and analysed it. Third, we implemented several strategies before and during data collection to help prevent biases in interview materials. For example, we identified potential participants through WWC documents and broader internet searches. At the start of each interview, we explained that we were seeking a diversity of perspectives on each WWC’s impact, including critical, negative or ambivalent views. We emphasised the anonymity and confidentiality of the interviews, invited participants to recommend others who might hold different or contrasting perspectives, and monitored emerging data to ensure a balanced range of accounts, including negative experiences of each WWC. Finally, we had no regular contact with the vast majority of interviewees, reducing the likelihood that existing relationships would influence their responses.

Our insider-outsider position meant we understood the context and had access to key individuals who might not want to speak as candidly to outsiders. This meant that interviewees felt comfortable speaking about the impact (or absence) of WWCs which allowed us to develop a richer and more informed understanding. We are also aware that WWCs work in highly politicised environments, where what counts as evidence and what is impactful remains open to debates and disputes. WWCs are, in many cases, funded by government departments and so their existence and impact are political topics. We pick up on this context in the findings and return to it in our conclusion.

Based on our review of the literature, we devised an impact framework *a priori* to conducting the research, discussed it with brokers including some WWCs, ensuring we would account for the variety of KB impacts. The framework, depicted in Tables 1 and 2 below, illustrates different potential impacts of KBs with associated impact evaluation tools. Whereas the academic literature might target the most robust and usually resource-intensive evaluation methods as the aim, this is a tailorable resource that can be used and adapted by knowledge brokers, funders and others to assess impact. This model builds on existing research and our observations across the field. Our previous research (Vallance et al. 2025) discussed three types of impact based on interviews with WWCs, namely facilitating access to evidence, developing close relationships with decision-makers, and capacity-building to use evidence. Following further conversations with WWCs and other brokers, but also WWCs’ audiences, we refine those impacts into four categories.

## 4. Findings

This section presents the different types of impact that stakeholders attributed to WWCs. Figure 1 below depicts WWC impacts across the four categories, illustrating the varied ways in which

**Table 1** Types of knowledge brokering impact.

| Impact type                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instrumental impact:</b> changes in policies and/or practices e.g. in government, public services, public bodies, business, academia, third sector, funders, NGOs               | <ul style="list-style-type: none"> <li>• Influence the development of policy positions or decisions, shape policy agendas, contribute to the formulation and/or implementation of policies, influence approaches to policy implementation or service delivery, increased understanding of policy options to address an issue</li> <li>• Influence changes in practices and/or behaviours <i>via</i> the adoption of evidence-based/informed approaches</li> </ul>                                             |
| <b>Conceptual impact:</b> changes in ways of thinking, addressing or debating a specific topic/issue and/or increased understanding of the value of evidence to help inform policy | <ul style="list-style-type: none"> <li>• Contribution to improving understanding of a topic/issue or raising awareness of an issue</li> <li>• Contribution to understanding what evidence is, how it can be used and what it can be used for/culture change around evidence + what kind of evidence counts in the field within which the WWC operates (e.g. lived experience; RCTs; going beyond RCTs. . .)</li> <li>• Influence on shift in dialogue or reframing of the debate on an issue/topic</li> </ul> |
| <b>Capacity-building impact:</b> strengthened capacities of end users to understand, review and use evidence                                                                       | <ul style="list-style-type: none"> <li>• Practices and processes set up to build individual, organisational and systems' ability to understand, review and use evidence</li> <li>• Changes in individual end-users' knowledge and skills to engage with evidence and develop new solutions</li> <li>• Changes in organisations' and/or systems' ability to understand, review and use evidence</li> </ul>                                                                                                     |
| <b>Relational impact:</b> new or stronger partnerships, engagement or networks that deepen the use or application of evidence                                                      | <ul style="list-style-type: none"> <li>• Establishment of new platforms, spaces, networks bringing people and organisations together around a topic/issue central to the WWC's work</li> <li>• Establishment of partnerships around a topic/issue central to the WWC with the aim of deepening the use or application of evidence</li> <li>• Establishment of relationships around a topic/issue central to the WWC with the aim of deepening the use or application of evidence</li> </ul>                   |

WWCs affect the skills, knowledge, actions, networks and attitudes of people, organisations, and systems within which they operate. A detailed breakdown for each type of impact is shown in [Appendix 2](#).

There is a fine line between attitudes (thinking) and behaviours (doing), meaning that some examples discussed under one impact type might also fit under another type of impact, depending on interpretation.

## 4.1 Instrumental impact

Instrumental impact of knowledge brokering (green circle in [Fig. 1](#)) are reflected in changes to actions and practice. This type of impact is common in the literature and is often measured by citations in policy documents. For example, a decision-maker spoke about how the Centre for Homelessness Impact (CHI) developed policy briefings during the spending review that they believed helped 'to convince the Treasury that we should do something on homelessness' (CHI3).

**4.1.1 Direct and indirect impact.** Instrumental impact can be direct. This can include helping stakeholders to understand a problem, develop policies and new ideas, make decisions, or stopping decision-makers doing something (on the latter, WCPP9). For example, What Works Wellbeing's (WWW) impact in getting wellbeing to be included in standard appraisals of government projects in the UK government Green Book survey was often cited

(WWW6; 2; 5). Instrumental impact could also be indirect, by bringing independent challenge to decision-makers or informing practice such as new teaching material. For instance, a third sector interviewee described how there was a huge difference in their organisation telling policy-makers about a problem or solution, and a WWC doing it, which 'carried a different heft' (CHI5).

**4.1.2 Impact across the decision-making process.** Our interviews revealed how instrumental impact is much wider and more granular than policy citations and is often visible throughout the decision-making process. For example, a policy official explained how the Wales Centre for Public Policy (WCPP) had helped them 'look[ . . . ] at what was out there, to help us start to narrow down what our focus might be' (WCPP7) This was supported by another WCPP interviewee who suggested that the work as 'really helpful, in terms of just helping us frame direction of travel' (WCPP6). Another interviewee described how the work that WWW did on community wellbeing had 'opened [their] eyes to some of the complex debates about how you distinguish between individual and community wellbeing', which influenced their strategic direction (WWW9). These examples illustrate how WWCs, and other KBOs, play crucial roles in helping decision-makers to think about a problem through evidence and support them to select what might be a useful policy response.

**4.1.3 Impact beyond policy change.** The instrumental impact of KB went beyond policy change, with interviewees citing

Table 2 Types of knowledge brokering impact and evaluation tools.

| Impact type                                                                                                                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Possible measurement (based on existing practice and reading of the literature)<br>NB: these measurement tools can apply to the four types of knowledge brokering impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conceptual impact:</b> changes in ways of thinking, addressing or debating a specific topic/issue and/or increased understanding of the value of evidence to help inform policy | Contribution to improving understanding of a topic/issue or raising awareness of an issue                                                                                                                                                                                                                                                                                                                                   | Counting number of outputs, downloads, attendees, views, capacity building programmes put in place by the WWC, networks set up by WWC and linked to, partnerships set up and details of partnership work<br>Interviews<br>Reflection session, policy reunion or other event format to discuss the various impacts (or absence of) of the project/WWC with stakeholders<br>Text mining: e.g., how has a particular term been used across the debate since the WWC has started mobilising it?<br>Assess in individuals and organisations a changed culture of evidence: e.g. survey and interviews<br>Staff surveys in partner organisations<br>Stakeholder survey questions focused on the four types of impact<br>Repeat customers: a sign of client satisfaction (but also what are the new projects focused on? e.g. more in-depth, using more skills/experience of the KB)<br>Logic model or programme theory helping to define what impacts the KB seeks to have, how it will have those impacts, and how those will be measured<br>Citations of WWCs and their outputs and staff in documents<br>Recommendations made by the WWC have been adopted by policy, practice, protocols, guidance, other actors, organisations or processes<br>Invitations of the WWC to contribute to policy exercises such as policy conception events and meetings with policy-makers<br>Network analysis to find out who is downloading/viewing WWC outputs and/or attending WWC events, cluster them by types of stakeholders, and trace how these stakeholders use those outputs/info and how they build connections <i>via</i> the WWC<br>Tracking behaviour or attitude change practice put forward by WWC and its adoption e.g. website, publications, talks. This could be also be done <i>via</i> interviews and/or focus groups<br>Participatory mapping exercise<br>Have fellowships, embedded research, any other collocated roles been set up within this partnership? (interview those people) |
|                                                                                                                                                                                    | Contribution to understanding what evidence is, how it can be used and what it can be used for/culture change around evidence + what kind of evidence counts in the field within which the WWC operates (e.g. lived experience; RCTs; going beyond RCTs. . .)                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                    | Influence on shift in dialogue or reframing of the debate on an issue/topic                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Instrumental impact:</b> changes in policies and/or practices e.g. in government, public services, public bodies, business, academia, third sector, funders, NGOs               | Influence the development of policy positions or decisions, shape policy agendas, contribute to the formulation and/or implementation of policies (e.g. what they choose to do, how they choose to do it) (policy understood as government policy but also policy in other organisations), influence approaches to policy implementation or service delivery, increased understanding of policy options to address an issue |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                    | Influence changes in practices and/or behaviours <i>via</i> the adoption of evidence-based/informed approaches                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                    | Auditing practices and processes set up to build individual, organisational and systems' ability to understand, review and use evidence<br>Changes in individual end-users' knowledge and skills to engage with evidence and develop new solutions<br>Changes in organisations' and/or systems' ability to understand, review and use evidence                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Capacity-building impact:</b> strengthened capacities of end users to understand, review and use evidence                                                                       | Establishment of new platforms, spaces, networks bringing people and organisations together around a topic/issue central to the WWC's work                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                    | Establishment of partnerships around a topic/issue central to the WWC with the aim of deepening the use or application of evidence                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                    | Establishment of relationships around a topic/issue central to the WWC with the aim of deepening the use or application of evidence                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Relational impact:</b> new or stronger partnerships, engagement or networks that deepen the use or application of evidence                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

how WWCs, *via* their outputs, informal discussions, or embedded staff, had helped them develop new ideas, be that in policy or elsewhere such as research (EEF8 and WWW9) and 'helped [them] to consider what we do next' (WCPP5), which is closely linked to conceptual impact. Interviewees also discussed how mobilising WWC evidence or working with a WWC was used by their organisation as a seal of approval, demonstrating that they were doing 'the right thing'. This illustrates a performative element to the demand for evidence, and links to our discussion on the politics of impact. One school leader for example challenged a national regulator's decision using Education Endowment

Foundation (EEF) evidence (EEF5). Interviewees explained how working with a WWC constituted 'a helpful validation' of what they were doing (CHI6), with another explaining that it 'provid[ed] a level of assurance to our stakeholders [...] and that the recommendations they have are sound recommendations that will ultimately deliver a difference' (CHI4).

The instrumental impact of KB was also exemplified by changes in practice. This was especially the case for EEF stakeholders who explained how they used resources, such as evidence toolkits, in their day-to-day work. They cited specific evidence reviews produced by EEF and explained that their training courses had



Whereas other WWCs were working in fields where the issue's existence was less disputed such as homelessness, WWW had to work hard in making the issue matter to stakeholders.

WWCs were also seen to broaden the framing of key concepts to create more alignment between a wide range of stakeholders under 'a more welcoming umbrella' (WWW1). WWCs had 'change[d] the understanding of the sector' on topics such as rough sleeping, with new 'language and terminology' (CHI2, echoed by CHI1) and 'expand how . . . lots of us thought about' an issue (WWW9). In other cases, WWCs were seen to have enabled stakeholders to reframe the debate on a topic themselves because the broker's work had 'narrowed down options and given a helpful explanation of what the options are' (WCPP7).

Adjacent to this impact of shifting the debate on a topic, WWCs were seen as having inspired other contexts to think about the issue and where a 'what works' style approach could add value. One interviewee explained how 'What Works served as an enormous inspiration to the Canadian wellbeing policy community. I think we created the [name of network] in a sense to try and move towards having something like that in Canada' (WWW interview).

**4.2.2 Impact on how evidence is valued and understood.** The second area where WWCs were thought to have had a conceptual impact was on how evidence is valued and understood by decision-makers. This often took the shape of helping to develop the evidence base in the field, in terms of quality (e.g. reliability and validity) but also breadth of evidence—something that WWCs were created to achieve. Centres were also seen to have developed among organisations and sectors a growing understanding and valuing of evidence and its role in decision-making. One interviewee explained how in their sector:

'There is a much more hard-headed approach now to say that we absolutely need the best possible foundation on which to build this policy and to draw on all of the evidence' (EEF8)

This wider culture change was supported by another interviewee who mentioned how EEF was 'shifting the lens of schools onto evidence all the way through' (EEF5).

Stakeholders believed that the brokers provided evidence that 'has been systematically reviewed' with 'some reliability and validity' (EEF8). Others argued that the WWCs had 'improved [their] understanding of what [they] can do around developing the evidence base in Wales around important policy priorities' (WCPP3).

Participants highlighted conceptual impacts of WWCs in helping change how individuals, organisations and systems think and behave in relation to evidence. For instance, one interviewee explained how EEF has, through 'lots of work testing out different ways of putting the evidence in the hands of decision-makers in [schools]', developed learning on how the school system makes decisions and use evidence in that process (EEF8). In the case of CHI, the Centre was seen as influential on what kind of evidence counts and specifically illustrated how working with CHI had made them think differently:

'[W]henever you read data or read reports and things like that, you're constantly looking at it from a different perspective as a result of our work with the Centre for Homelessness Impact.' (CHI interview)

**4.2.3 How WWC evidence is perceived.** Participants also discussed the shortcomings of the evidence which WWCs provided. For instance, several mentioned that the evidence produced or shared by a WWC was too qualitative (WCPP6), complex and difficult for them to apply (WCPP3 and EEF10). This illustrates the contrasting understanding of what ought to count of evidence and what constitutes good and/or useful evidence. Some thought that WWCs could be too doctrinaire in their approach to evidence (WCPP9), at the risk of replacing professional judgement (EEF4). It was argued that WWCs should let people make their own mind up about what the evidence says (CHI2). Another criticism was that WWCs were accused of being good at building insights but not a knowledge base which is probably best left to specialist academics in the field (EEF4). Many interviewees also discussed how WWCs had not changed their understanding of evidence over time. This may also be linked to people being unwilling to recognise their individual limitations, which relates to our point about the politics of impact.

**4.2.4 Ways to improve conceptual impact.** Some interviewees outlined areas for improvement for WWCs. We heard that WWCs needed to better scan the context within which they work and better align their missions and activities to the interests of key stakeholders (WCPP3; 4; 9; EEF3 and EEF10). Other interviewees however, usually not from large stakeholder organisations, stated the opposite and thought that WWCs ought to 'plant a flag' where issues mattered to them (CHI1; EEF4; WWW3). This would help to raise their profile as some stakeholders noted that they had only come across the WWC recently even though they were meant to be a key player in their sector. This was a point mentioned for all the WWCs we studied.

**4.2.5 Measuring conceptual impact.** Table 2 lists potential tools suggested by existing literature and which have already been deployed by KBs.) This includes interview questions asking participants whether their understanding or awareness of an issue/topic and/or evidence has changed since engaging with the KB. This is the approach we took. Text mining could also track how particular ideas/topics articulated by a broker are picked up and used across policy, media and society. Finally, repeat customers are a sign that evidence users value that broker.

To summarise, conceptual impact is visible on how evidence is valued and understood. WWCs are perceived to provide valuable syntheses of evidence which builds the evidence base and helps to inform policy and practice. There is also an impact on how a topic or issue is viewed with WWCs changing ways of thinking on an issue and improving understanding of the value of evidence to inform decision-making.

## 4.3 Capacity-building impact

Capacity-building is an oft-mentioned type of KB impact in the literature and concerns strengthening the capacities of end users to understand, review, and use evidence (orange circle in Fig. 1). This was by far the most cited impact theme among our interviewees. Participants explained that WWCs had 'a really good sense of trying to take complex methodologies, different approaches, and present[ed] them in an easy-to-understand way' (WWW5). For example, WWCs helped decision-makers use programme evaluation techniques and acted as a one-stop shop for the sector

by developing helpful evidence summaries. This access to evidence *via* reviews and syntheses but also toolkits (e.g. What Works Wellbeing's impact on wellbeing toolkit) was highly valued by interviewees.

**4.3.1 Helping people understand a problem.** This capacity-building impact was visible when WWCs helped decision-makers understand a problem, its scale, causes and solutions. In these examples, the brokers worked together with stakeholders in defining a problem which was amenable to evidence, discussing how to address the problem, and then providing evidence to improve understanding of what caused it and how it might be overcome. For example, one WWC worked collaboratively with stakeholders to build a dataset which helped them understand the biggest issues they were facing (CHI2). WWCs 'sharpened [their] thinking and understanding about the interrelationships between different aspects' of a problem (EEF8), discussing potential barriers to implementing a new policy (WCPP5), or thinking about a problem across multiple sectors rather than in a siloed approach (WWW5). This capacity-building role saw brokers working in a co-productive way with decision-makers rather than telling them what to do, compared to more traditional approaches such as training.

**4.3.2 Develop skills and capacities.** WWCs were seen as effective in helping stakeholders to develop specific skills and capacities such as coaching individuals to gain particular professional skills (EEF6 and 7), helping them use concepts (WWW9) or conduct rapid evidence reviews (WWW3), communicating to different audiences and facilitation methods (WWW3; EEF8), evidence literacy (EEF8), helping stakeholders to produce outputs and capacity-building resources for their own staff (WWW7), peer reviewing (WCPP10), helping decision-makers to understand how to implement policies (WCPP2), writing policy briefs (WWW4), and not making 'sloppy assumptions about the evidence' (WWW8).

WWCs were impactful in developing understanding of certain disciplines and topics (WWW4), helping stakeholders look at the data in a way that could enhance their decision-making (CHI8; CHI7) or collecting data in a different way to understand what impact that organisation was having on an issue (CHI7). The impact of a WWC regarding accessing, monitoring, linking and using data was especially prevalent among CHI interviewees, with a participant explaining how the broker had helped them refine their approach to data, metrics and measuring rough sleeping (CHI1). This focus on data in the field of homelessness is especially relevant for monitoring rough sleeping and what impact different policies are having on improving outcomes.

**4.3.3 Providing extra capacity.** Capacity-building impact also involves bringing extra capacity to decision-makers. For example, WCPP was seen as a 'body that could act as an intermediary', providing government with 'a way of accessing an external research capacity, without having to go through complicated procurement' (WCPP2), and 'drawing the evidence that is out there' into government (WCPP7). Some of these brokers had worked across levels, for instance 'work[ing] well with local authorities to raise their understanding of, and access to, evidence' (CHI3). This supplementing of internal capacity regarding accessing and using evidence was discussed across interviews and was especially important for devolved and local

decision-makers who have smaller policy and analytical capacity than national decision-makers.

Sometimes helping decision-makers access and use evidence involved WWCs signalling where the gaps were in those organisations' current datasets and how to plug those:

'I know ourselves and other stakeholders have been impressed by the questions that they're [meaning CHI] asking, in terms of not necessarily what we do have but what we [do not] have, in terms of data and evidence, and how we can use that to shape our own work.' (CHI4)

**4.3.4 Ways to improve capacity-building impact.** Interviewees felt that more could be done by WWCs to help build the absorptive capacity of decision-makers regarding evidence (EEF4; WCPP9) and to develop individual brokers in stakeholder organisations (EXP1; WCPP9). Fewer comments for improvements were mentioned for this type of impact type than for others.

**4.3.5 Measuring capacity-building impact.** Table 2 illustrates the different tools that could be used to measure this type of impact. As we are looking to examine changes in individual end-users' knowledge and skills to engage with evidence and develop new solutions, stakeholder and staff surveys could ask how brokers have improved in these areas.

In sum, capacity-building impact not only includes providing people and organisations with new skills (e.g. evaluation skills) to change practice but also helping them to understand a problem and its possible solutions. WWCs provided public sector partners with extra capacity which helped to facilitate impact.

## 4.4 Relational impact

The final KB impact discussed by our interviewees was relational which involves new or stronger partnerships, engagement or networks that deepen the use or application of evidence and/or help decision-making (turquoise circle in Fig. 1).

**4.4.1 Convening power.** The convening role and power of brokers was often mentioned by interviewees. WWCs brought stakeholders together into networks, which they sometimes hosted and managed (e.g. the Centre for Ageing Better). This convening role was demonstrated through organising events such as roundtables and conferences where issues that matter to the target audiences of WWCs were discussed. It was also visible in bringing common language for a given community of practice (EEF5).

Stakeholders noted that taking part in roundtable or conference-type events organised by WWCs increased their network connectivity:

'They were in a very unique position where they were able to invite government, arm's length bodies, the public sector and the sector. So, they were in a very privileged position where they could call on multiple stakeholders to discuss whatever issue it might have been' (WWW5).

This convening of stakeholders was perceived as a particular strength of WWCs. A policy official explained WCPP was 'really good at networking and getting people in the same room

physically' allowing people to network (WCPP9), with a government stakeholder explaining that the WWC had 'brought together people that we wouldn't have thought of bringing together', thus developing new connections among stakeholders (WCPP7, see also CHI8).

#### 4.4.2 Helping others build networks and connections.

WWCs were also seen to be successful in helping stakeholders develop their own networks and initiate new projects and collaborations with peers (e.g. local authorities for CHI's and schools for EEF) often after attending events organised by a Centre. WWCs had become, in some cases, anchor organisations in a dispersed field, allowing like-minded people and organisations from across sectors—e.g. public, private, third—to meet. Consumers of WWC outputs also spoke about how it sparked conversations between colleagues and contacts (WWW10).

This relational impact was seen by stakeholders as helping them to meet to share evidence of 'what works':

'where the Centre for Homelessness Impact have really, really been brilliant is, for example, we're aware that [other local authority name] are going through a similar process to us [...]. And it's helping us establish the knowledge of what they're doing' (CHI4)

Stakeholders appreciated the opportunity to find out how similar organisations were doing well on an issue and what worked for them. They could also discuss together candidly what is known, for instance about a problem, and explore suitable policy responses. As one interviewee put it, this is about learning together and from others' experiences:

'it's always good to meet and talk with people because yeah, not being that 'Oh, we are the best,' kind of thing, because there would have been some learning about how things are done. It's just about being part of a [group name], I guess, is really positive because you meet with other people, you learn their experiences.' (CHI9)

Another relational impact was one where WWCs connected stakeholders to people who could constructively challenge them. The brokers were seen as being gatekeepers and critical friends who could be trusted by decision-makers and where conversations could remain confidential. Ministers would for instance value these networks and events as opportunities to test pitfalls and implementation challenges, and being able to ask 'is this the right thing to do? How could it be better as a policy' (WCPP8), something that they might not be able to do more publicly.

**4.4.3 Ways to improve relational impact.** WWCs could improve their impact in this area through better networking with other WWCs working on similar questions (EEF8). Networks in some sectors were sometimes seen as already existent and tight, e.g. for instance in smaller policy communities such as in devolved nations, and the work of these brokers was not always useful (CHI6). Stakeholders believed that WWCs should strengthen their own networks to reach different audiences (WWW3 and 8; EEF10) and that just running events is not a sufficient approach to building connections and making change happen (WWW6).

**4.4.4 Measuring relational impact.** Table 2 above illustrates how tracking which networks brokers are part of and host, participatory mapping, and network analysis could all help trace the convening and networking impact of brokers. But measuring this type of impact is hard to quantify.

Relational impact can be understood as brokers convening networks, as well as helping stakeholders develop their own networks and collaborations. It is an important type of impact which is often overlooked in the literature on research impact but is crucial for knowledge brokering when relationships and activities that bring people together are needed to discuss what works and improve practice.

## 5. Conclusion

This study of What Works Centres illustrates the different types of impact that knowledge brokers can have. It contributes to existing research and practice in three ways. First, for research and practice, we provide a four-pronged categorisation of KB impact which has been developed with KB practitioners and tested with stakeholders. This allowed them to reflect on the various impacts of KB, moving away from often narrow instrumental understandings of impact. Capacity-building and relationship-building are often seen as pathways to impact, but we argue that they need to be considered as types of impacts in their own right. Helping people and organisations access, understand and use their internal data, or facilitating access to new networks where they can build relationships and discover best practice in their field, are significant examples of KB impact and differentiate it from research impact.

What also emerges from these findings is how overlapping and mutually reinforcing the different impacts are, forming different parts of a 'whole' for impact to materialise. We show how KB's impacts are not isolated events but often involve collaboration and working between the broker and its audiences to achieve impact (see also Jensen-Ryan and German 2019 for this focus on collaboration as a key factor for KB success). Our research complements existing scholarship by adding an empirical and comparative analysis of a specific type of organisation doing brokering within the policy process and across sectors, as well as assessing their impact and how this is achieved. Many interviewees highlighted the importance and benefits of *working with* brokers in achieving or generating change. These instances of impact are often taking place within long-term and in-depth partnerships set up with the WWCs, echoing existing research which has demonstrated the value of sustained partnerships and funding of brokering initiatives (Reed et al. 2014, Caves and Lueling 2021).

Our second contribution is in documenting impact that goes beyond counting citations in policy documents and training courses. By asking stakeholders, rather than relying upon self-reported evidence provided by brokers, we provide a richer and more in-depth picture of KBO impact, as well as where they could improve (Reed and Rudman 2023). The findings reveal that KBOs can offer opportunities for broader impacts beyond instrumental impact to include conceptual impact where they affect how an issue is understood and how evidence is valued, capacity-building impact to improve skills, and relational impact where stakeholders in a field are convened to help resolve complex problems and build better evidence of what works. —and the research adds to a literature that is dominated by evidence of

individual knowledge brokers often working in health-related settings.

Finally, for practice, we provide a feasible and tailorable approach for framing and evaluating impact for resource-strapped knowledge brokers working in academia, policy, practice and in-between spaces. This could be a resource that can be used and adapted by brokers, funders and others across fields and contexts to assess impact. Building on existing research and practice, Table 2 offers a smorgasbord of potential impact evaluation tools for knowledge brokers. In a context where brokers, especially WWCs, will often be compared to each other, it is important to highlight that brokers often have areas where they are more influential, with for instance WWW doing particularly well according to interviewees on conceptual impact and CHI being seen to perform well on instrumental impact. This could be a useful lesson for brokering initiatives to prioritise their strongest potential areas for impact rather than attempting to achieve all types of impact.

This research has a few limitations. First, we base our analysis on the voices of stakeholders and those audiences that brokers are trying to influence. These individuals have multiple reasons for suggesting that a WWC has impact or not. Our aim in future work is to supplement these findings with other tools outlined in our framework, such as stakeholder surveys, data scraping, and network analysis to understand change. Bringing in other voices, such as producers of evidence could also help delve into the politics of WWCs and their impact, e.g. what other purpose, such as political signalling, do they play beyond providing evidence?

A second limitation is that we have collected data on only one type of knowledge brokering organisations, namely WWCs. Even though we selected organisations working across different sectors, using different brokering tools, and different audiences, it would be valuable to compare impact types to organisations in other contexts to analyse how they differ or resemble each other. Understanding the role of context on the impact of knowledge brokering needs more research. Third, in practice, KBs still often favour positive stories of impact, without a desire to discuss cases where impact did not happen and understand why. These exercises are however crucial to reflecting and improving practice and we hope that our findings and approach help to make that discussion of different types of impact, positive or negative, more commonplace.

## Author contributions

Eleanor MacKillop (Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing—original draft, Writing—review & editing), Ioana Filipas (Data curation, Formal analysis, Visualisation, Writing—review & editing), James Downe (Funding acquisition, Project administration, Supervision, Writing—review & editing).

## Supplementary material

Supplementary material is available at *Science and Public Policy Journal* online.

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## Data availability

Information on the data underpinning this publication, including access details, can be found in the Cardiff University Research Data Repository.

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