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Indicators for measuring the contributions of individual knowledge brokers

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ABSTRACT

An increasing number of knowledge brokers work at the interface between research, policy and practice. Their function is to facilitate processes to foster mutual learning among research, policy and practice. For some knowledge brokers, practical methodologies to assess the quality of their work is an important concern. While frameworks exist for assessing research impact at the level of a project or program, few are available for assessing contributions of individual knowledge brokers. In response to this, we have compiled a set of indicators to measure the quantity and quality of the contributions of individual knowledge brokers to projects, programs or platforms at the interface between research, policy and practice. The set is based on a review of the literature and the experience of a group of knowledge brokers active in water research and management in Switzerland, including the co-authors of this article. The set can be used by knowledge brokers to identify ways to improve the effectiveness of their practices and to demonstrate the benefit of their work to their employers and other stakeholders. Our approach is flexible enough that it can be applied where there are limited resources available for assessment.

1. Introduction

Environmental research often aims at achieving a broader impact on society and the environment. However, the actual impact of such research on policy and practice tends to lag behind aspirations (Campbell et al., 2015; Cornell et al., 2013; Cortner, 2000; Mauser et al., 2013; Roux et al., 2006; Watson, 2017). This is partially due to the fact that knowledge derived from research is just one factor among many that guide decisions of policy makers and practitioners. Pressure from economic markets and civil society, personal and professional values and beliefs, financial and human resource constraints, or cognitive and psychological factors often influence decision-making processes more than research knowledge, thus limiting the influence that research can have on policy and practice (Cairney et al., 2016; Owens, 2005). However, the benefit that research could potentially provide for society and the environment is also constrained by lack of productive exchange across the science-policy/practice interface (SPI). Researchers are sometimes not sufficiently informed about the concerns of decision makers and hence produce knowledge that is barely relevant for them or is poorly timed. On the other hand, decision makers are not always sufficiently aware of available research knowledge or its implications (Porter and Dessai, 2017).

Given these limitations, it has been widely argued that more productive processes and institutional arrangements at the SPI are necessary (Cash et al., 2003; Cvitanovic et al., 2015b; Hering, 2016; Holmes and Clark, 2008; Jäger et al., 2013; López-Rodríguez et al., 2015; McNie, 2007; Reed et al., 2014; van Enst et al., 2014). One suggested approach is to invest in knowledge brokers (KBs), that is, individuals (or groups of individuals) in charge of facilitating interactions at the SPI (Cvitanovic et al., 2015a,b; Hering, 2016; Meyer, 2010; Michaels, 2009). In fact, knowledge brokers are active around the world, not only in environmental research, policy and practice (Michaels, 2009), but also in fields such as public health (Bornbaum et al., 2015; Dobbins et al., 2009; Ward et al., 2009a) and education (Kitagawa and Lightowler, 2013; Whitchurch, 2009). However, empirical evidence on the effectiveness of the many and varied processes facilitated by knowledge brokers remains incomplete. This poses a major obstacle to the future development of knowledge brokering as only with reliable data is it possible to identify the most effective practices and further refine them. KB evaluation therefore has been identified as one of the top priorities on which future SPI research should focus (Cvitanovic et al., 2017; Klein, 2008; Ward et al., 2009a).

In this paper, we respond to this call by presenting a set of indicators to measure the contributions of individual knowledge brokers to projects, programs or platforms at the SPI; in the following, we will refer to projects, programs and platforms simply as 'programs', acknowledging

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that they differ with regard to team size, time frame, level of complexity and degree of institutionalization. The special feature of our set of indicators is its focus on the assessment of single individuals. Measuring the contributions of individual KBs is a complex task given that their contributions are difficult to disentangle from those of other team members and are subject to various external factors. The challenge is to find indicators that are responsive to the actions of the individual KB and which have low sensitivity to external factors. The focus of this paper is therefore on indicators pertaining to the processes involved in knowledge brokering ('process indicators'), and indicators that reflect process results on which KBs are likely to have a decisive influence ('attributable results indicators'). For both types of indicators, we provide metrics relating to quantity and quality of the contributions. To the best of our knowledge, this paper offers the most focused set of indicators in the sense that it concentrates exclusively on attributable indicators. At the same time, it is broad in terms of breadth of KB processes covered.

Our set of indicators is primarily intended to help knowledge brokers who seek a practicable method for self-assessment. First, it can help them to identify ways to improve the effectiveness of their daily work. Second, the indicators may be useful for knowledge brokers who want to demonstrate the benefit of their work at the SPI to their employers and other stakeholders. Third, it can inspire thinking about alternative processes of knowledge brokering and the desirable characteristics of the results. The inventory of KB processes that we provide, together with the indicators, may be particularly helpful in this regard. Finally, our list of processes and indicators can be used by knowledge brokers to sharpen their professional profiles and to clarify their roles vis-à-vis their peers, employers, and other stakeholders.

This article begins by discussing the various roles of knowledge brokers and the contexts in which they operate. It then explains 'contribution analysis' (Mayne, 2008; Morton, 2015) as the broader evaluation approach on which we rely and discusses the challenge of identifying attributable indicators. The subsequent section describes the materials and methods we used to compile the lists of KB processes and indicators. After we have presented the lists, we explain how they can be applied based on a stylized example from our experience. The article closes with a discussion of the strengths and limitations of the approach and an outlook on further research.

2. What are knowledge brokers?

In the light of pressures on research to produce 'useful' knowledge to solve today's environmental problems (McNie, 2007), knowledge brokers seem to be 'on the rise' (Holgate, 2012; Knight and Lightowler, 2010; Meyer, 2010; Whitchurch, 2009, 2013). However, their profession is not yet fully established (Bielak et al., 2008; Kislov et al., 2017; Knight and Lightowler, 2010; Lomas, 2007; Meyer, 2010; Turnhout et al., 2013). Their functions and roles are often poorly specified (Ward et al., 2009a), and some lack recognition, institutional support and training (Cvitanovic et al., 2015a). Therefore, knowledge brokers are sometimes described as 'invisible' (Meyer, 2010) or 'between worlds' (Bielak et al., 2008; Lomas, 2007).

Given these ambiguities, it comes as no surprise that the literature lacks an agreed definition of what knowledge brokers are. Definitions differ in particular regarding the specific roles and functions that are ascribed to them (Cvitanovic et al., 2015b). For the purpose of this article, we define knowledge brokers as persons who facilitate processes to foster mutual learning among research, policy and practice. The ultimate goal of such processes is to catalyze positive change in society and the environment. This definition is more restrictive than some of the existing definitions in the sense that we consider facilitation a necessary element of KB roles. This implies that, according to our definition, not every person participating in a process at the SPI is a knowledge broker. Only if the person takes an active role as facilitator is he or she considered a knowledge broker. For instance, a person from a research institute sitting on an advisory board of a government regulatory agency is taking part in a SPI activity and might contribute to a better understanding between researchers and regulators. However, we do not consider the person a knowledge broker unless he or she acts as a facilitator of the advisory board's activities. The same holds if this person gives a presentation during a congress organized by government partners, or teaches at a university or a public school. We are aware that teaching and consulting are sometimes considered part of knowledge broker roles (Meyer, 2010), and we also understand that many individuals we target with this article combine facilitation roles with teaching and consulting. However, for the purpose of this paper, we opt for the more narrow definition in order to focus on the core KB roles and to distinguish them from other SPI activities.

Knowledge brokers facilitate a broad spectrum of processes (Bornbaum et al., 2015; Michaels, 2009; Ward et al., 2009a). Typical examples of such processes include identifying knowledge needs and gaps, integrating relevant knowledge from various sources and from different knowledge holders, creating common ground and enabling mutual learning among the actors involved, facilitating the development of knowledge products and their dissemination, organizing various types of events, or supporting evidence-based policy and practice. Knowledge brokers combine these and other processes in various ways, thus resulting in unique roles for every KB.

Knowledge brokering roles also vary according to KB's institutional affiliations (Lomas, 2007). KBs may be affiliated with institutions on either side of the science-policy/practice interface, or with 'boundary organizations'. Boundary organizations are organizations specifically designed for the management of the SPI. In the ideal case, they are equally accountable to actors on both sides of the interface and hence can act as legitimate arbitrators (Cash et al., 2003; Guston, 2001; Parker and Crona, 2012; Sarkki et al., 2015). Depending on their organizational affiliation, KBs might face insecure career prospects due to their unconventional placement between established career paths. In the academic context, rules and norms for graduation, promotion and tenure do not always fully recognize knowledge brokering as part of research excellence (Campbell et al., 2015; Falk-Krzesinski et al., 2011; Hering, 2016; Klein and Falk-Krzesinski, 2017; Ward et al., 2009a). For the latter, the current article might be of special interest because it points to ways of demonstrating the value of their work for research, policy and practice.

3. Contribution analysis and attributable indicators

Knowledge brokers are usually appointed with the ultimate goal of facilitating broader impact on society or the environment. However, it is usually difficult to establish how knowledge brokers actually contribute to this goal as their contributions conflate with other influences (Bell et al., 2011; Morton, 2015; Reed et al., 2014). To address the complexity of conflated influences, evaluation approaches such as 'realist evaluation' (Salter and Kothari, 2014) and 'contribution analysis' (Bannister and O'Sullivan, 2013; Mayne, 2008; Morton, 2015) have been developed. According to these approaches, evaluations should be based on 'program theories' (Chen, 2005; Molas-Gallart et al., 2016; Rogers, 2008). Program theories are sets of assumptions about the ways a particular program is assumed to achieve its final goals (Morton, 2015; Rogers, 2008). They are sometimes also referred to as 'theories of change' (Blamey and Mackenzie, 2007; Janzen et al., 2016; Mayne, 2008) or 'impact pathways' (Douthwaite et al., 2003).

When developing program theories, special attention should be paid to specifying the contextual factors that might influence the effectiveness and efficiency of KB processes. By doing so, program theories can potentially protect knowledge brokers against unjustified accusations of poor performance. Existing KB frameworks can help in specifying those parts of program theories that refer to knowledge brokering. For example, Ward (2017) reviewed 47 knowledge brokering models and proposed a composite framework based on her findings. Greenhalgh