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Exploring the promises of transdisciplinary research: A quantitative study of two climate research programmes

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ABSTRACT

Scientists have long since become accustomed to explaining the future value of their work. Nowadays token statements are no longer sufficient. Societal impact must be embedded in the organisation of research. The call for societal impact is most explicitly expressed in and actively shaped by transdisciplinary research programmes. We have examined two questions related to compliance in the principal-agent relation between a programme and its projects. The first question concerns the risk of moral hazard: is societal actor involvement a token activity or a substantial component of the research process? The second question relates to possible adverse selection: does societal actor involvement produce the expected benefits and, if so, under which conditions? We surveyed members and project leaders of 178 projects in two transdisciplinary climate research programmes in The Netherlands. There is no reason to suspect large-scale moral hazard. Projects formally labelled as transdisciplinary have characteristics typically associated with transdisciplinarity but academic projects share those characteristics. Neither is there reason to suspect adverse selection. The archetypical properties of transdisciplinary research are associated with the expected societal benefits. An important finding is that there are different types of benefit, each of which requires its own approach. Benefit is achieved through informal involvement and a diversity of outputs, and much less by giving societal actors a prominent role or influence in the research process. Based on our conclusions we recommend customizing the design of climate research programmes and projects towards the needs of the specific societal benefits they aim to generate and reconsidering the emphasis on formal involvement of societal actors in funding procedures.

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1. Introduction

Science is expected to produce benefits for society. This expectation is articulated in grant conditions of research funders, in research evaluation protocols, in government policy documents and public science budgets, and in various other government policies (Mowery et al., 2001; Gulbrandsen et al., 2011; Lyall and Fletcher 2013).

Token statements, such as ‘this research contributes to solving cancer’, are increasingly becoming unacceptable. Real compliance with calls for solutions for societal challenges is more important than ever. Governments aim to secure compliance by introducing societal benefit criteria in ex-ante assessments to try to reduce

adverse selection by trying to select those researchers most capable of doing the job (Fernandez-Carro, 2007). For example, the European Commission requires researchers, who apply for a share of Horizon 2020’s 31 billion euros allocated to solving seven Grand Challenges, to clearly indicate what specific impact their project will have and precisely how they will achieve this impact. Governments also aim to reduce moral hazard, the risk that scientists are not performing as agreed upon, by introducing societal benefit criteria in ex-durante and ex-ante assessments. A well-known example is the impact narrative in the REF 2014.¹

The challenge is to ensure that researchers embed the objective of societal impact in the organisation of their research. Transdisciplinary research is generally acknowledged as a mode of organising research that is likely to result in societal benefits. By involv-

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¹ Research Excellence Framework 2014, Assessment framework and guidance on submissions (January 2012).

ing industry, local communities, regional governments, NGOs, and other societal actors in the research process, it is expected knowledge is better adjusted to user needs, commitment is created for contentious solutions, and scientific inventions are turned into new products and processes. Although there is no widely agreed upon definition of transdisciplinarity, recurring elements in definitions are 'collaboration between academics and societal actors', 'integrating knowledge' and 'real-world problem-oriented' (Carew and Wickson, 2010; Walter et al., 2007; Wagner et al., 2009; Wickson et al., 2006). These characteristics occur particularly in strategic research programmes, in which societal actor involvement is a crucial part of the research design (Hessels and Deuten, 2013).

Strategic research programmes with societal actor involvement as well as other inclusive research modes call for new evaluation criteria that reflect the interdisciplinary and transdisciplinary nature of research, the interests of the actors involved, and the variety of outputs and outcomes it produces (Carew and Wickson, 2010; Wagner et al., 2009). There are two questions when it comes to identifying a particular mode and evaluating its impacts.

The first question is if societal actor involvement is a token activity or a substantial component of the research process. Do societal actors participate in or associate with projects and, if they do, do they have influence on the research process and its outcomes? The growing call to involve societal actors may tempt scientists to comply in name but not in fact to secure their share of available funds. Weingart (1997) is concerned that although a research programme might have a transdisciplinary design, the research projects in the programme will still be organized along disciplinary lines. Weingart's concern may be warranted, as Pohl (2005) found that to many researchers transdisciplinarity is just another demand from the research programme.

The second question is whether and under which conditions societal actor involvement produces the expected benefits (Jolibert and Wesselink, 2012; Phillipson and Lowe, 2012). The involvement of societal actors in scientific research has been the subject of many empirical studies (e.g. Cohen, 1997; Roelofsen et al., 2011; Talwar et al., 2011; Olmos-Peñuela et al., 2014a). It is generally accepted that involving societal actors in research is conducive to generating societal impact. Yet, there remains a lack of systematic quantitative evidence on the effects of their involvement (Abreu et al., 2009).

In this paper, we use a principal-agent perspective to look for an answer to the two questions. Is societal actor involvement real or token? And does it fulfil its promises by producing the expected societal benefits?

The structure of this paper is as follows. In the next section we present our theoretical framework. We discuss transdisciplinarity literature, conceptualize the relationship between government and science in terms of principal-agent theory and integrate these two strands of literature. In the third section we explain the context of our study. In the fourth section we present our data and method. Our data consists of an administrative project database and a survey among project representatives. Data is analysed using non-parametric tests and regression models in Section 5. In Section 6 we draw conclusions, discuss our findings and formulate policy recommendations.

2. Theoretical framework

In this section we describe how societal actors are involved in transdisciplinary research, how their involvement may result in societal impact, and how strategic research programmes organise societal actor involvement to achieve the higher objective of societal benefits. We examine the problems they have to deal with from a principal-agent perspective.

2.1. Involving societal actors in research

Since Lewin first showed the potential of action research (Lewin, 1946), a number of organisational modes has emerged that explicitly aim for science to produce societal change. They range from action research (Reason and Bradbury, 2001) and participatory action research (Whyte, 1991) to cooperative inquiry (Heron and Reason, 1986), mode-2 research (Gibbons et al., 1994), transdisciplinary science (Rosenfield 1992; Pohl, 2008), and knowledge co-production (Jasanoff, 2006). These research modes have two significant commonalities: they aim to produce practical knowledge for a specific (social) context and they do so by engaging, involving, and empowering societal actors. We position our paper in the context of transdisciplinary research. However, the results are equally relevant for mode-2 research, knowledge co-production, or any of the other modes.

The origin of the notion of transdisciplinarity can be traced back to Jantsch (1972) who envisioned a new way of problem solving, moving beyond the disciplinary organisation of academic knowledge development. His vision encompasses the integral coordination of science, education and innovation, aimed at contributing to a societal issue. The understanding of Jantsch's notion has evolved. Numerous definitions of transdisciplinarity have been proposed but there is as yet no consensus definition (Pohl, 2011). Many authors do use Rosenfield's description (1992) that emphasises the integration of knowledge by researchers from different disciplines and societal actors from different fields, working on a common problem over an extended period of time, and developing shared conceptual frameworks, skills, and goals (see also Choi and Pak 2006).

Scientists operating in a transdisciplinary research setting are expected to actively engage and collaborate with societal actors (Lawrence and Després, 2004). Societal actors can be involved as official project partners, but their contributions can also be organized more loosely. Olmos-Peñuela et al. (2014b) emphasize that relations with societal actors regularly remain non-formalized, involving no legal or other traceable documents. Both formal and informal interactions are positively associated with the use of research results (Landry et al., 2001).

Scientists interact with and involve societal actors in research, for example as reviewers, advisors, users of new technologies, or recipients of new knowledge. From the societal actor's perspective – the 'citizen' – involvement or participation may primarily be a political issue. Arnstein (1969) frames citizen participation as a redistribution of power, a way for the have-nots to gain (some) influence over the haves. From the alternate perspective, that of the 'scientist', societal actor involvement is both a knowledge production issue and a political issue, an external demand imposed by government and research funders.²

2.2. How transdisciplinary research has societal impact

The involvement of societal actors is said to be conducive to achieving societal impact. Societal actors tend to focus on practice and on products that can be applied in specific contexts rather than on future rewards from the scientific community (Podestá et al., 2013). In many studies societal actor involvement has been positively associated with the development of societally relevant knowledge (e.g. Walter et al., 2007; Raftery et al., 2009; Meagher

² Societal actor involvement also arises from the intrinsic motivations of scientists and is actively supported in spaces provided by universities, for example in university extensions. See, for example, the work of the National Alliance for Broader Impacts at <http://broaderimpacts.net/and> Lam (2011) on the motivations of scientists.

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