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“Identifying enabling factors of science-policy interaction in a developing country context: A case study of South Africa's environment sector”

Susanne Koch*

Technical University of Munich, Chair of Forest and Environmental Policy, Hans-Carl-von-Carlowitz-Platz 2, 85354 Freising, Germany

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ABSTRACT

The integration of science into environmental policymaking has become a prime topic of decision-makers and scholars worldwide. The current body of research, however, is characterised by a narrow focus on the global North; moreover, the impact of meso- and macro-level conditions on science-policy interaction is largely ignored.

In light of these gaps, the aim of this paper is to highlight enabling factors of ‘boundary work’ in a developing country context, using South Africa's environment sector as empirical case. The findings are based on qualitative document analysis and expert interviews.

Taking the South African National Biodiversity Institute as a starting point, the paper identifies three factors related to the policy domain that seem decisive for its effectiveness: supportive law that constitutes a crucial source of legitimacy for boundary work; the availability of an absorptive administration, which is willing and able to take up expertise; and the existence of a strong science community producing policy-relevant knowledge that deals with the country's specific problems. Without such conducive conditions, the author infers, boundary work in the sector would not have the same level of impact. The paper calls for more research on the context of science-policy interaction, not only but particularly in developing countries.

1. Introduction

With the rise of increasingly complex and interrelated environmental challenges such as climate change, biodiversity loss and deforestation, the question of how to use science for tackling environment-related problems has become exigent for policymakers and scientists alike. In recent years, several scholars have examined the interaction between them in an attempt to understand the difficulties impeding the integration of scientific knowledge into political decision-making. While the fields under investigation are quite diverse, ranging from forestry, agriculture and biodiversity policy (Franks, 2010; Kristjanson et al., 2009) to conservation planning (Franks, 2016; Nel et al., 2016), waste and water management (Dörendahl, 2015; van Enst et al., 2016; White et al., 2008) and the governance of climate change (Hoppe et al., 2013; Hoppe and Wesselink, 2014; Lee et al., 2014; Reinecke, 2015; Tribbia and Moser, 2008; Ziervogel et al., 2016), many barriers for linking knowledge and action seem to be of general nature. Incongruent time frames and required levels of abstraction, insufficient mutual

understanding, knowledge contestation and its strategic use, uncertainty versus the quest for ‘facts’ are only some of the obstacles encountered (Bechmann, 2003; Jones et al., 2008).¹

Aside from identifying the obstacles impeding science-policy interaction, researchers increasingly investigate the fabrics of institutional arrangements at the science-policy interface (Maasen and Weingart, 2005). In that context, the analytical concept of ‘boundary organisations’ has come to the fore, defined as “institutions that straddle the shifting divide between politics and science” (Guston et al., 2000: 1). The body of literature presenting empirical cases is rapidly growing; it includes studies on highly diverse organisational bodies at the national and international level as well as ‘boundary objects’ of various types (Blades et al., 2016; Strickert and Bradford, 2015; van Pelt et al., 2015; White et al., 2010).

There are, however, ‘blind spots’ of research pertaining its geographic coverage and its focus level. Regarding the first, the vast majority of studies on science-policy interaction are carried out in the global North (Clark et al., 2016).² Given that the leading ‘knowledge

* Chair of Forest and Environmental Policy, Technical University of Munich, Germany.
E-mail address: susanne.koch@tum.de.

¹ For a comprehensive literature review, compilation and categorisation of problems regarding science-policy interaction, see van Enst et al. (2014).

² This applies to those drawing on boundary theory, but also to those using alternative analytical frameworks such as the ‘RIU model’ recently presented by Böcher and Krott, 2016. Developed on the basis of empirical projects in Austria and Germany, it has hitherto mainly been applied in countries of the global North (Heim and Böcher, 2015; Nagasaka et al., 2016a, 2016b; Stevanov et al., 2013). Notable exceptions are case studies on Indonesia (Dharmawan et al., 2016; see also Dharmawan et al., 2017) and Vietnam (Do Thi et al., 2017).

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societies' in which science-policy interaction is most pronounced (as well as most of the scholars concerned with the topic) are mainly located in Europe and North America, the focus on these world regions appears somehow natural. The consequence, however, is that the existing research body is strongly biased towards Western conceptualisations, ideals and experiences. Nonetheless, hypotheses about successful knowledge transfer derived from these studies are "increasingly being used to guide reform in potentially different contexts of the developing world" (Clark et al., 2016: 4615). This is problematic insofar as the conditions for science-policy interaction vary in significant ways: In many developing countries, polities are comparatively weak as states pass through phases of political transformation or lack the means to sustain the institutions formally created (Smith, 2003). Science systems are often constrained: Although in recent years, a growing number of developing nations has increasingly invested in research, many scientific communities remain limited in productivity due to the small human resource base, insufficient budgets and deficient research infrastructure (Gonzalez-Brambila et al., 2016; Hassan, 2008). While the impact of such structural conditions has not yet been systematically analysed, it is obvious that science-policy interaction in developing countries takes place in distinct settings to which success factors as identified in Western industrialised countries may simply be not applicable. Considering the context-specificity of science-policy interaction, it is precarious to draw generalisations from Northern experience and posit they are globally valid (Court and Cotterrell, 2006; Hoppe et al., 2013). In light of the current gap in literature, various scholars have emphasised the need to carry out empirical research in the global South which highlights the specific conditions actors and organisations at the science-policy interface are confronted with (Clark et al., 2016; Hoppe et al., 2013; Jones et al., 2008; McNie et al., 2008).

The fact that the context in which science-policy interaction takes place is often disregarded hints at the second blind spot of research, namely factors related to the policy domain and the political-cultural sphere that enable or constrain boundary work in a certain setting (Hoppe, 2010; van Enst et al., 2016). Most existing studies analyse science-policy interaction from a micro-level perspective, i.e., they investigate the concrete activities and relationships of actors involved in specific processes targeted at scientific knowledge transfer. While this focus helps to reveal what exactly happens in such processes, it overlooks important meso- and macro-level conditions that delimit science-policy interaction in a given context (Hoppe, 2010; van Enst et al., 2016).

In view of the two research gaps outlined above, the aim of this paper is to identify enabling factors of boundary work in a developing country context, using South Africa's environment sector as empirical case. The latter has been selected on the basis of previous research which indicated that the sector is comparatively strong with regard to policy development and the integration of local scientific knowledge into such processes (Koch and Weingart, 2016). In the remainder of the paper, I will proceed as follows: I will first introduce boundary theory and the main analytical concepts used for this study (chapter 2). I will then explain the methodological approach adopted (chapter 3) and provide some background on the policy field under investigation (chapter 4). In chapter 5, I will present my empirical results: After characterising the South African National Biodiversity Institute as boundary organisation, I highlight enabling factors related to the policy domain that seem decisive for its impact. Following a discussion of findings in chapter 6, I will close with a short conclusion and considerations for further research (chapter 7).

2. Boundary theory

Science-policy interaction has become a prominent subject of research across a range of academic disciplines. Scholars from various fields have suggested models that, depending on the underlying school of thought, conceptualise the relationship between science and political

decision-making in different ways and, thus, provide different explanations for problems of interaction (Pregernig, 2014).³ Adopting a constructivist perspective that views the science-policy interface as discursively produced, this paper draws on boundary theory as an analytical approach. It originally emerged in the context of studies about the demarcation of science from non-science: Gieryn (1983) used the notion of 'boundary work' to describe how scientists justify claims to authority and resources by distinguishing science from other intellectual activities, thus drawing 'boundaries' to 'save' their system. The 'boundary' idea promptly gained prominence in social sciences, particularly among scholars investigating the interface of knowledge production and political decision-making; a couple of seminal studies including Jasanoff (1994), Moore (1996) and Guston (1999) shifted the focus on the processes and rules of boundary-making as well as on the organisations and actors involved therein. By today, boundary theory has evolved into a comprehensive approach that encompasses multiple concepts ranging from 'boundary objects' (Star and Griesemer, 1989), 'standardized packages' (Fujimura, 1992) and 'boundary-ordering devices' (Shackley and Wynne, 1996) to 'boundary agents' (McNie et al., 2008), 'boundary arrangements' (Hoppe, 2010) and 'boundary configurations' (Jungcurt, 2013).

Although boundary theory thus offers a rich 'toolbox' of concepts, it has been criticised for lacking the analytical precision to grasp what practically happens on the ground when knowledge 'co-production' takes place (see, for instance, Böcher and Krott, 2016; Reinecke, 2015). Acknowledging that the multiplicity of terms and the lack of one single framework contribute to some level of ambiguity, this study nonetheless draws on boundary theory for two main reasons: first, since it represents an approach which conforms with the author's constructivist perspective on the issue at stake; and second, because it allows to look *beyond* the micro-level of science-policy interaction and illuminate the context in which the latter takes place.

In the following, I will highlight elements of boundary theory's analytical repertoire that I used for the analysis of the empirical case, namely the concepts of 'boundary organisations, objects and agents' and, an issue which is comparatively under-researched, 'enabling factors' of boundary work.

2.1. Boundary organisations, objects and agents

Particularly relevant for this paper is the notion of 'boundary organisations' that have been conceptualised as institutions "mediating between science and policy and facilitating the interaction between actors on either side" (Cash, 2001: 432). According to Guston (1999: 93), boundary organisations are characterised by at least three defining attributes:

1. they provide a space that legitimizes the creation and use of boundary objects (...);
2. they involve the participation of both principals and agents, as well as specialized (or professionalized) mediators; and
3. they exist on the frontier of two relatively distinct social worlds with definite lines of responsibility and accountability to each.

Referring to 'boundary objects', Guston draws on Star and Griesemer (1989: 393) who described them as "both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across site (...). They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation". Empirical examples include models, forecasts, and assessment reports through which "farmers and economists, state and local officials, emergency managers and climate

³ For an overview of different science-policy conceptualisations and selected models of scientific knowledge transfer, see Pregernig (2014) and Böcher and Krott (2016).

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