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Socially robust knowledge in coastal projects

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ABSTRACT

Interactive modes of knowledge production offer a strategy for seeking solutions to complex environmental problems. The outcome of such knowledge production is socially robust knowledge. Social robustness refers to knowledge that is relevant and accepted by actors in the context of its application. This is achieved when knowledge is credible, salient and produced in a legitimate way. To date, only limited research has focused on how social robustness is achieved. As coastal problems are characterised by conflicting interests and major uncertainties, the coastal zone represents a relevant domain for studying socially robust knowledge. This paper analyses and presents three conditions that need to be in place if one is to achieve socially robust knowledge in coastal projects. The conditions are based on theories related to socially robust knowledge, boundary spanning, project arrangements and knowledge arrangements. The conditions specify how social robustness can be achieved through knowledge testing by boundary spanners, the involvement of diverse actors and a close connection between knowledge production and the evolving project. In a case study, these conditions are compared to developments in a Dutch coastal project involving spatial developments near the Ems estuary. The comparison highlights the relevance of the three conditions in achieving socially robust knowledge. In addition, a fourth aspect is empirically uncovered: the role of boundary spanning among project partners prior to producing knowledge. These four conditions clarify how social robustness may be achieved in coastal solutions. As such, this paper contributes to the theoretical and empirical understanding of socially robust knowledge.

1. Introduction

Interactive modes of knowledge production promote the opening up of processes of knowledge production to researchers and non-researchers. Concepts such as Mode 2 knowledge and post-normal science offer strategies for seeking solutions to complex, interdependent environmental problems (Funtowicz and Ravetz, 1993; Gibbons et al., 1994). Such means of knowledge production aim to achieve relevant research and produce socially robust knowledge as an outcome (Gibbons et al., 1994; Nowotny et al., 2001; Hessels and Van Lente, 2008). Social robustness refers to the societal acceptance of knowledge, achieved by knowledge becoming relevant in the 'context of application'. Although some authors are critical of the concept of Mode 2 knowledge

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(Hessels and Van Lente, 2008; Weingart, 2008), it is also the most famous description on the opening up of processes of knowledge production (Hessels and Van Lente, 2008; Gross and Stauffacher, 2014). Many such applications can be found in diverse areas of environmental decision-making including nature conservation, climate change, natural resources management, agriculture, water management and coastal issues (Gross, 2006; Vogel et al., 2007; Giller et al., 2008; Aeberhard and Rist, 2009; Edelenbos et al., 2011; Bruckmeier, 2012).

The deliverance of socially robust knowledge is a key goal of Mode 2 knowledge production (Gibbons et al., 1994; Nowotny et al., 2001). The authors specify how to achieve social robustness through combining three closely related aspects. First, robustness should be tested outside the research arena so that social, economic, cultural and political factors can influence the developed knowledge. Second, social robustness is achieved through involving an extended group of experts, users and laypersons. Thereby representing a form of transdisciplinary research that balances the inputs and interests of stakeholders and researchers (e.g. Pohl, 2005). Third, robustness results from repeatedly testing, modifying and expanding the developed knowledge that is initially not robust (Nowotny et al., 2001; Nowotny, 2003). Cash et al. (2003) proposed three criteria to evaluate the relevance of knowledge for environmental decision-making: knowledge should be credible to important actors, relevant to the needs of the decision-makers (salience) and produced in a legitimate way (legitimacy).

It follows that social robustness demands the involvement of diverse actors. In general, experts, bureaucrats and stakeholders have differing norms when it comes to producing knowledge (Edelenbos et al., 2011). More specifically, the criteria of salience, credibility and legitimacy are normative (Vogel et al., 2007; Hegger et al., 2012) and actors therefore interpret them differently. Further, these criteria involve trade-offs and are therefore difficult to achieve simultaneously (White et al., 2010; Cook et al., 2013). Consequently, achieving social robustness is a complicated task and, instead, knowledge may become irrelevant to the end-users (McNie, 2007; Sarewitz and Pielke, 2007).

To date, only limited research projects have focused explicitly on socially robust knowledge in the context of environmental decision-making. The three aspects of Nowotny et al. offer an initial, yet abstract answer on how to achieve social robustness. For instance, it remains unclear who should test the developed knowledge; whether the aspects apply while developing knowledge for complex environmental issues; how one can determine when society accepts the new knowledge (Weingart, 2008). Consequently, the aspects of Nowotny et al. require specification when analysing socially robust knowledge in environmental decision-making. In addition, the criteria suggested by Cash et al. (2003) serve an evaluative purpose, that is to test whether knowledge is relevant for decision-making, and are therefore of limited use to explore how social robustness is achieved. A few case studies focussed on social robustness, showing that involving many parties can result in socially robust solutions (Gross, 2006; Van Der Windt and Swart, 2008).

Given the complicated task of achieving social robustness and the limited theoretical and empirical research into developing socially robust knowledge, the objective of this paper is twofold: we aim to elaborate the three aspects of Nowotny et al. (2001) and explore how they work in a complex coastal decision-making process. The problems addressed in coastal projects tend to be complex and interdependent due to conflicting interests and large knowledge uncertainties in a coastal zone (Weinstein et al., 2007; Coffey and O'Toole, 2012). As such, coastal projects represent a relevant context in which to study socially robust knowledge. The case study is of the Dutch Marconi project that addresses spatial developments in Delfzijl, a seaport located near the Ems estuary.

The remainder of this paper is divided into four sections. Section 2 discusses how theoretical conditions for socially robust knowledge are derived from the three aspects of Nowotny et al. Section 2 also explains the applied method. Section 3 presents the case analysis of social robustness found in a multifunctional solution in Delfzijl and this is then compared to the developed theoretical conditions. The implications for social robustness in coastal projects of this comparison are discussed in Section 4. Finally, Section 5 draws important conclusions on achieving social robustness in coastal solutions.

2. Specifying socially robust knowledge in coastal projects

There is quite some ambiguity in the concepts of socially robust knowledge and its 'context of application' (Hessels and Van Lente, 2008; Weingart, 2008). Hessels and Van Lente conclude that the context of application remains a complicated concept and Weingart argues that it remains unclear what is meant with socially robust knowledge as it is unclear what is meant with contextualisation.[1] We therefore first specify our interpretation of socially robust knowledge and context of application. We adopt a process-based definition for knowledge[2] given our research interest in how to achieve social robustness. Nonaka et al., 2000 defines knowledge as a dynamic human process of justifying personal beliefs towards the truth. As social robustness refers to the societal acceptance of knowledge in the context of application, this dynamic human process becomes a multi-actor process involving researchers, policy makers and other societal actors. Since we focus on coastal projects, the project environment becomes the context of application wherein knowledge should be socially robust. We assume that social robustness is (eventually) achieved when *all* actors involved in the coastal project accept the developed knowledge.[3]

[1] One interpretation that Weingart offers is that contextualisation may refer to the context-sensitivity in knowledge production. This context-sensitivity affects the ways in which problems are perceived, defined and prioritised.

[2] Many definitions exist for knowledge, see for instance Cook and Brown (1999) for an epistemological underpinning of knowledge and knowing at the individual and group level.

[3] Actors are defined as individuals or groups of individuals. We present in this paper a case study wherein all actors involved in the coastal project eventually accepted the developed knowledge for a proposed solution.