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Transitions in urban water management and patterns of international, interdisciplinary and intersectoral collaboration in urban water science



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ABSTRACT

Practitioners and scientists dealing with urban water management call for a transition to adaptive regimes. Transition management theories claim that to induce transitions, new forms of research are necessary which cut across traditional disciplinary, organizational and sectoral boundaries. Are such current calls for collaboration reflected in a fundamental change in scientific practices at the international level? This paper explores whether we witness cross-boundary interactions in professional networks and changes in the knowledge production towards more collaborative patterns in urban water science. To this end, we investigate both the professional interaction network at an international congress and the development of scientific output over the last two decades, using social network and bibliometric techniques. The results suggest that the professional interactions indeed reflect the cross-boundary interactions needed for a transition. However, the emerging patterns in scientific output do not indicate an actual system level shift towards a new mode of knowledge production.

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1. Introduction

Urban water management – the practice of managing the urban water cycle as a whole in coordination with the hydrological water cycle – is an increasingly complex, uncertain, multifaceted, and knowledge-intensive challenge (Klein, 2004; Van der Brugge et al., 2005; Brown et al., 2011; De Graaf et al., 2011). Trends such as explosive growth of urbanization, mismanagement of water resources, growing competition for the use of freshwater, and degraded sources by pollutants contribute to this complexity (Tejada-Guibert and Maksimovic, 2003).

For water management in general, so called adaptive regimes are perceived as crucial for a meaningful response to complexity and uncertainty (Pahl-Wostl, 2007). This also goes for urban water challenges, where concepts such as adaptive urban water management, water sensitive urban design, sustainable urban drainage systems, low impact development, and integrated urban water management have been developed (De Graaf et al., 2011). Expertise in adaptive urban water regimes is, almost by definition, interdisciplinary and intersectoral (Maksimovic and Tejada-Guibert, 2001; Keath and Brown, 2009; Brown et al., 2011). Urban water management requires knowledge from many different disciplines, as well as the cooperation of a wide range of stakeholders. No single actor or discipline can solve complex urban water problems alone.

As such, urban water management reflects broader trends in the management of public goods, where one can witness more generally a call for transitions (Elzen et al., 2004; Van der Brugge et al., 2005; Loorbach and Rotmans, 2006). Transition management aims at moving socio-technical systems in areas like health, energy, infrastructure, and environment from one equilibrium to another. Transitions are characterized by multi-phase, multi-actor, and multi-level processes, which challenge transitional causal understandings of relationships within the socio-technical systems (Loorbach, 2007; Brown et al., 2011). As a result, programmatic studies on transition management often ask for interdisciplinary or transdisciplinary research (Bunders et al., 2010).

Such calls for a different kind of scientific research concur with ideas on new modes of knowledge production (Gibbons et al., 1994; Nowotny et al., 2001) and post-normal science (Funtowicz and Ravetz, 1993) from the sociology of science. The quintessence of these ideas is that scientific research shifts from traditional 'Mode 1', discipline-based knowledge production within academic institutions toward a new 'Mode 2' knowledge production which is interdisciplinary, cross-boundary, and includes scientists, engineers, designers, policy makers, NGOs and other stakeholders.

At the conceptual level, transition theories link characteristics of transition processes and the need for new knowledge production (Loorbach, 2007). It is unclear, however, whether we can indeed empirically observe such a shift to new modes of knowledge production at the system level. The aim of this paper is to assess if there is a transition in the field of urban water science (UWS) by examining two key areas: cross-boundary social interactions in the professional community and collaborations in research publishing. Specifically, our research questions concern:

- (1) To what extent do we see cross-boundary interactions between professionals and researchers in the urban water management community? How does the level of cross-boundary interactions compare to other fields in water research?
- (2) To what extent are cross-boundary interactions within the professional interactions reflected in more collaborative work in research publishing? More specifically, to what extent do we find an increase in interdisciplinary, intersectoral and international collaboration in scientific knowledge production?

In Section 2 we describe the congruence in the ideas on transitions in adaptive urban water management and in collaboration patterns in scientific research. This enables us to articulate our research questions more systematically. In Section 3 we explain how the data have been collected and which methods have been used to answer the research questions. We present the results in Section 4. In Section 5 we interpret and integrate our findings. In Section 6 we present our conclusion, discuss the implications and assess the limitation of our study.

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