

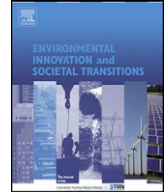


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Space and scale in socio-technical transitions

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ABSTRACT

The multi-level perspective (MLP) is a widely adopted framework for analysing stability, change and transitions in socio-technical systems. Key to explanations of change is the interaction between nested levels (niche, regime, landscape) constituting socio-technical systems over time. This paper proposes a second generation, multi-scalar MLP that explicitly incorporates a spatial scale. Recent developments in innovation studies and contributions from regional studies and geography are reviewed. We draw on notions of space as being relational, fluid and contested by institutionally situated actors. Dynamics in socio-technical systems are explained not only by interactions between modes of structuration and developments over time, but also by interactions between actors and institutions situated across different levels of spatial scale. The paper explores the kinds of insights that might emerge from adopting a second generation MLP to socio-technical systems with a case study of biomass gasification in India.

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1. Introduction

The literature on socio-technical transitions documents many case studies. Almost all of these studies assume a national setting. Denmark is an often cited example for its pioneering role in the development of wind turbines (cf. Garud and Karnoe, 2003; Kamp et al., 2004) and biogas (cf. Geels and Raven, 2007); Germany is well-known for its leading role in many renewable energy technologies (cf. Jacobsson and Lauber, 2006); the Netherlands is credited for applying a transition management

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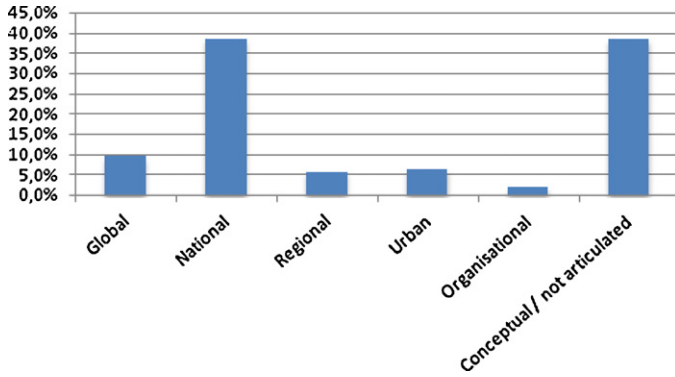


Fig. 1. Distribution of the geographical delineation in papers published in the field of transition studies in the period 1994–2011. “Global” studies focus on the world, continents or ‘developing countries’. “National” studies delimit their empirical analysis to a specific country. “Regional” provide a sub-national focus (such as states in the US or India). “Urban” studies focus on cities. Finally, a number of papers focus on firms. “Conceptual/not articulated” are largely “theory” papers with no explicit geographical delineation.
Source: Markard et al. (2012).

approach in energy (cf. Kern and Smits, 2008; Loorbach, 2007), or for failing in the development of renewable energy technologies (cf. Geels and Raven, 2006; Negro et al., 2008); Sweden is seen as an example in the development of biofuels (cf. Hillman et al., 2008); India has achieved some success in the development of biomass gasification technologies (Verbong et al., 2010); and so on. These studies suggest (often implicitly) that the national is the right geographical delineation for understanding sustainability transitions. This also becomes clear when we look at 446 papers published in the transition studies field since the mid-1990s (Fig. 1).

This framing of transitions as predominantly national is at odds with scholarship in innovation studies which has investigated the globalisation of science, technology and innovation (Howells, 1990; Archibugi and Michie, 1997; Pavitt and Patel, 1999; Carlsson, 2003), and in regional studies and economic geography which has placed caveats by the focus on national contexts for innovation, arguing that actors and institutions at multiple spatial levels interact to create ‘spaces for innovation’ (Amin and Thrift, 1992; Storper, 1997; Bunnell and Coe, 2001; Amin, 2002; Sunley, 2008). This paper is concerned with theorising the implications of multiple spatial levels for the multi-level perspective (MLP) on socio-technical transitions.

The MLP currently conceptualises transitions as the outcome of interactions between three levels: regimes, niches and landscapes that describe socio-technical systems. At its heart these levels correspond with variations along two scales: a temporal and a structural scale. The spatial scale of socio-technical systems is not explicitly conceptualised. In the context of globalisation and regionalisation this may lead to simplistic or incorrect analytical assumptions and empirical analysis. Indeed, empirically the three levels (niche, regime and landscape) are often implicitly conflated with specific territorial boundaries: regimes tend to be depicted with national features (these being the focus of much empirical research); landscape dynamics with international features; and niches with (sub-)national or local features.

Theoretically, however, there is no reason to conflate the MLP levels with specific territorial boundaries. The MLP levels refer to processes with different temporal dimensions and modes of structuration that could each have a variety of spatial positionings and reach. In niches, social networks are less extensive, less stable, expectations more fragile, and learning process are less institutionalised than in regimes, but such networks need not be exclusively local (Berkhout et al., 2011). Likewise, socio-technical regimes may be transnational in physical extent, in the institutions that constitute them, or in the economic and technological base that supports them, or, conversely, remain regional or local in their spatial reach. For most regimes that are significant for sustainability, national territories are certainly not the only salient space.

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