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Sustainability transitions in developing countries: Major insights and their implications for research and policy

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ABSTRACT

Sustainability transitions literature is a rapidly growing and influential field of research. It argues for a radical change of systems providing human needs. Being triggered by the negative implications of the Western post-war model of development, major transition frameworks such as multilevel perspective, strategic niche management or transition management have been widely used to clarify and motivate socio-technical transformations in mainly more economically developed world. Because of their sustainability appeal, however, transition perspectives began to be applied in developing countries. This paper takes stock of and systematises the theoretical insights from this application. Using systematic review method of 115 publications released in the last decade, the paper discusses novel methodological and conceptual lessons around: experimentation and upscaling; stability, change and power; regime uniformity; contextual forces; path-dependence; transnational linkages; normative orientation and other aspects. Although the identified insights confirm the middle range character of the transition theory, they force some reflexivity and raise new research questions for both contexts. The paper also identifies a few policy implication for international organisations, donors, governments and civil society organisations.

1. Introduction

Sustainability transitions literature is a rapidly growing and influential field of research (Markard et al., 2012; Chappin and Ligtvoet, 2014). It builds on the argument that the interconnected, complex and global character of current challenges such as climate change or growing social inequalities, requires a radical change in the basic systems providing societal needs for energy, water or shelter (Schot and Kanger, 2016). The term we use to describe such a change is transition, whereas the systems that need to undergo the transformation are conceptualised as socio-technical (see Fig. 1). Socio-technical implies that every aspect of life, from technology, institutions, economy to the socio-cultural sphere, must transform for a system change to be effective (Elzen et al., 2004; Wieczorek and Berkhout, 2009; Grin et al., 2010). Thanks to its sustainability potential, the notion of socio-technical transition has attracted attention in policy circles. Policymakers are interested in transitions because incremental, technical changes based on end-of-pipe solutions, cleaner products or eco-efficiency, are not believed to lead to sustainability (Wieczorek and Elzen, 2005).

Various models developed in this field aim to explain how transitions unfold and how to govern them. The most fundamental model, which has also formed the basis for other approaches, is the Multilevel Perspective on system innovation (MLP) (Geels, 2002, 2005). MLP distinguishes three levels, as shown in Fig. 1. The central level comprises of socio-technical regimes: sets of rules and routines that define the dominant 'way of doing things'. Regimes account for path-dependence, stability and are often locked-in, which hinders radical change. Regimes are stabilised by the socio-technical landscape, a 'broad exogenous environment that, as such, is beyond the direct influence of actors' (Grin et al., 2010, p. 23). Landscape encompasses such processes as urbanisation, demographic changes, wars or crises that can put pressure on regimes making them vulnerable to more radical changes. Regimes transform on condition of availability of alternatives that can fulfil the same societal function. Alternatives are developed in niches, protected spaces, that facilitate experimentation with novelties. In the context of the MLP, system transformation is driven by change agents and occurs in the outcome of mutually reinforcing contextual, landscape pressures, internal regime destabilisation processes and upscaling of innovations developed in niches. The orientation of change is assumed sustainable with strong emphasis on the environmental aspects. The strategic navigation of the process of niche formation is labelled as Strategic Niche Management (SNM) (e.g. Kemp et al., 1998; Raven, 2005; Schot and Geels, 2008). SNM argues for shielding, networking, learning and alignment of expectations as preconditions of construction, empowerment and upscaling of niches (Smith et al., 2014). Transition Management (TM) perspective (e.g. Loorbach and Rotmans,

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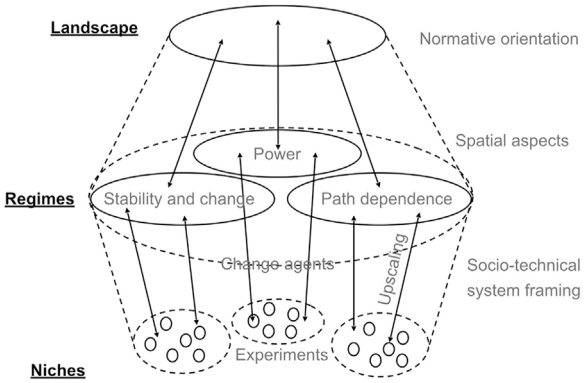

Fig. 1. A multilevel perspective on system innovation showing the key aspects. Adapted from Geels (2002).

2006, 2010; Loorbach, 2007) has been developed to shed more light on navigating this complex process. Its essence lies in influencing, coordinating and bringing together (niche) actors and their activities in such a way that together, they can accelerate the change towards sustainability.

Triggered by the negative implications of the Western post-war development model, the major transition frameworks (MLP, SNM, TM)[1] have been widely used to clarify and motivate socio-technical transformations in the more economically developed world. Thanks to their sustainability appeal, these approaches were later adopted in rapidly developing Asian economies (e.g. Berkhout et al., 2009a,b, 2010, 2011), and in the least developed countries of Africa (e.g. van Eijck and Romijn, 2008; Byrne et al., 2011; Baker, 2015). This application resulted in a number of lessons which have not been systematically analysed, preventing policy recommendations regarding ways to stimulate transitions in the developing world.

This paper takes stock of and systematises the theoretical lessons learned. In particular, I focus on novel conceptual lessons and search for methodological and disciplinary extensions of the three dominant transition frameworks. I also identify new research directions and policy implications. The overall aim is to reflect on what we can learn from the use of transition approaches in non-Western contexts. The research question I address is:

What are the major lessons from applying transition approaches to studying system innovation and the prospects in developing contexts, and what do they imply for further research and policy?

This paper is based on a systematic review of transition literature as applied in developing and emerging economies, and structured as follows: In Section 2, I explain the research methods. Section 3 is an overview of the insights based on the sample of 115 analysed documents written between 2005 and 2016 and structured along the MLP levels and concepts. In Section 4, I reflect on the policy implications of these insights and potential new research directions, concluding with Section 5.

2. Methods

In social sciences, the systematic review method has been developed as a transparent and rigorous approach to identify and synthesise research findings (Petticrew and Roberts, 2006) of sufficient quality about a specific research question or subject (Higgins and Green, 2010). The systematic review is considered particularly useful for disseminating key findings of large and complex bodies of research literature. It is guided by a set of clear principles to highlight opportunities for further research (Briner and Denyer, 2010). According to Victor (2008: 1), the following features distinguish a systematic from a traditional literature review: “as far as possible, it should be comprehensive in its coverage of the literature; pay careful attention to the quality of included evidence; take a clear, systematic approach to the synthesis of the data; and generally follow transparent and rigorous processes”.

These four factors served as guidelines for this paper. I selected a comprehensive set of contributions that adequately represents the body of work published within the field of sustainability transitions in developing countries. To ensure the quality of the evidence, I chose peer reviewed journal articles, books and PhD theses included in Scopus. To comply with rigour and transparency requirements, I followed a systematic process of identifying and analysing publications.

There have been at least four earlier efforts to map the contours of sustainability transitions literature and identify the publications that constitute this field (Geels, 2013a,b, three bibliometrics analyses by Markard et al., 2012; Chappin and Ligtvoet, 2014; Sengers et al., 2016). As these and other bibliographic analyses in transitions studies were either conducted up until 2013[2] or focused on specific themes e.g. experimentation (Sengers et al., 2016), I decided to carry out a new Scopus and Web of Science search as described in Table 1.

Since MLP provides a common theoretical foundation for SNM and TM, I chose to organise the specific lessons following the logic and concepts of the MLP rather then per framework. This includes (see Fig. 1, from bottom up): *niche* formation, experiments as seed of change, process of upscaling, change agents and factors, spatial aspects of transitions; issues related to *regime*, its stability, change, power, path dependence; *landscape* forces and a more overall system framing and a normative orientation of change.

3. Major insights

3.1. Niche formation

Niches are shielded places where radical innovations emerge, away from the pressure of existing regimes (Raven, 2005) see Fig. 1. The early transition literature on Strategic Niche Management (SNM) distinguishes three internal niche processes: the formation of networks that support and nurture novelties, the learning processes and the articulation of expectations to guide the learning processes (Grin et al., 2010).

Niche formation including the three nurturing processes is the longest studied theme in the literature on transitions in the developing world. The SNM framework is used to assess the state of the niche and inform policy. It is, in general, found a useful tool for analysing unfolding and technological cases (see Sale and Dewes, 2009; Shah et al., 2009; Rehman et al., 2012; Sun and Xi, 2012 respectively). Most of the lessons learned can be seen as a reiteration of the framework (Opazo, 2014; Byrne, 2009; Verbong et al., 2010; Derwisch et al., 2016; Kamp and Bermúdez Forn, 2016; Xue et al., 2016). SNM is also often used in a non-standard way, e.g. for value chain analysis (Rehman et al., 2010; van Eijck and Romijn, 2008; Caniëls and Romijn, 2008b; Caniëls et al., 2007) or is enriched with other theories, such as learning-based approaches (Drinkwaard et al., 2010; Romijn et al., 2010) and Social Network Analysis (Caniëls and Romijn, 2008a). These extensions give

[1] A Technological Innovation System (TIS) perspective (Bergek et al., 2008; Hekkert et al., 2007; Wieczorek and Hekkert, 2012) is often considered as one of the transitions frameworks. However, following the analytical steps explained in the methods section, and in particular using the combination of the keywords ‘TIS’ and ‘transition’ or ‘transformation’ yields hardly any documents. This confirms that TIS originates from a different body of scholarship than MLP, SNM and TM. A quick screening of ‘TIS articles' on developing contexts (ca 50 in the analysed period) further shows that TIS is rather used to clarify the diffusion of specific technologies than to reflect on broad transition processes, which is the focus of this paper. I therefore excluded this framework from the analysis.

[2] Although 2013 may seem recent, transition studies is a rapidly developing field; excluding recent publications would have a negative impact on the findings presented in this paper.