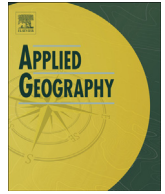




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Micro-dynamics in regional transition paths to sustainability - Insights from the Augsburg region

Simone Strambach*, Gesa Pflitsch

Philipps-University Marburg, Department of Geography, Deutschhausstraße 10 D, 35032, Marburg, Germany

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ABSTRACT

While there has recently been an increased interest in urban and regional transitions to sustainability, there are little profound insights about the emergence, design and enforcement of regional transition paths to sustainability (RTPS). The latter are characterized by organizational and institutional dynamics that affect multiple regimes and cannot fully be captured with the niche-regime categories of the multilevel perspective (MLP). This paper is therefore based on recent approaches from evolutionary economic geography (EEG) that focus on how actors at the micro-level use the plasticity of paths to enact change. The transition path and underlying micro-dynamics over more than 30 years in the Augsburg region revealed in an empirical study are visualized in the form of a transition topology. The results show that RTPS do not exclusively originate in protected spaces. Actors use the interpretative flexibility of institutions and establish organizational proximity between different institutional logics thereby eroding institutional consolidations and allowing new configurations within the path. Gradual institutional changes lead to more fundamental changes in social practices over the long run.

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1. Introduction

In light of the global acceleration of anthropogenic climate change, the increasing resource scarcity and social fragmentation, cities and regions are confronted with the challenge to develop in a more sustainable i.e. nature and human compatible direction. This requires a fundamental change towards more sustainable social practices and a transformation of their socio-technical infrastructure (cf. Bulkeley, Castan Broto, , Hodson, & Marvin, 2011; Hodson & Marvin, 2010). Researchers from the field of urban studies therefore increasingly refer to Geels's (2004) prominent multilevel perspective (MLP), which offers a tool to capture socio-technical change processes in their entirety, and the related approaches of strategic niche (SNM) and transition management (TM). At the same time spatial aspects have received more attention in the sustainability transition literature after some seminal contributions (e.g. Coenen, Benneworth, & Truffer, 2012; Raven, Shot, & Berkhout, 2012; Truffer & Coenen, 2012) pointed out the influence of the spatial institutional environment on socio-technical transitions and their multi-scalar character, (cf. Wolfram & Frantzeskaki, 2016). Both

research streams - sustainability transitions and urban studies - recognize the need for new forms of governance activities that involve a diversity of societal actors to solve the complex sustainability challenges mentioned above (cf. Bulkeley, Castán Broto, & Maassen, 2014; Loorbach, 2010; McCormick, Anderberg, Coenen, & Neij, 2013). With more management oriented approaches researchers try to deliberately initiate and steer these governance processes at the regional or sectoral level (cf. Loorbach & Rotmans, 2010; Loorbach, 2010). Based on their involvement and experiences over the past ten years in transition management, Loorbach and Rotmans (2010: 243) emphasize that "every transition project is unique in terms of context and participants and therefore requires a specific contextual and participatory approach". They conclude that there is no "standard recipe" for how to manage transition projects. This is in line with evolutionary theory that regards regional development as a contingent and path dependent process. The long-term outcome of transition processes is hard to predict, as they are shaped by both purposeful and unintentional mechanisms.

Empirical studies have also shown that urban and regional transition processes are based on complex dynamics on the micro-level. However, a largely open question is how these micro-dynamics are connected with long-term transition processes at the aggregated urban or regional system level. To gain insights into this connection we suggest an evolutionary institutional framework

* Corresponding author.

E-mail address: simone.strambach@geo.uni-marburg.de (S. Strambach).

to identify the endogenous unfolding of regional transition processes. We therefore introduce the notion of *regional transition paths to sustainability* (RTPS) and examine three important aspects that have not been explored in depth in the above mentioned research streams that focus explicitly on the geography of sustainability transitions. *First*, by shifting the focus to RTPS, the implementation and integration of new sustainable solutions in many different regimes is acknowledged. The focus of most transition studies on specific socio-technical regimes, primarily from the utility sector, does not fully encompass the thematic breadth of sustainability in a regional transition process. In particular, the social dimension of sustainability is rarely recognized. *Second*, it is argued that change does not only develop in protected, deliberately created spaces but that regional paths offer actors opportunities to initiate change from within. Regional paths are characterized through the overlap of institutional settings, multi-regime dynamics and place specificity and thus provide diverse possibilities for adjustment and recombination of existing institutions. *Third*, although transition scholars have emphasized the long-term character of transitions (cf. [Loorbach & Rotmans, 2010](#)), many empirical studies focus on the initial stage of a transition process (cf. [Brown, Farelly, & Loorbach, 2013](#); [Hansen & Coenen, 2015](#)) and thus do not capture the outcome of micro-dynamics at later points in time. If and how changes are stabilized is not considered in depth.

In agreement with scholars from institutional theory, we argue that we need to acknowledge the “contingent and emergent nature” of institutional change and “adopt a broad, processual understanding of strategy” in order to better understand the interplay of actors and structure in RTPS ([Gertler 2010, Lawrence & Phillips, 2004: 708](#)). In the empirical part of this paper, a longitudinal and process-oriented approach is followed to reconstruct the dynamics actors induce with their activities and what outcomes these activities have in the long run. For this purpose a transition topology is developed, which captures the RTPS of the Augsburg region across different institutional fields over a time-span of more than 30 years. The transition topology establishes a link between major institutional and organizational changes over time and thus brings dynamics to the fore which have remained largely hidden in transition research so far. Our framework and analysis show how social agency is shaped by the place-specific institutional environment and in turn how agency maintains, modifies and shapes this institutional environment in regional paths. It not only contributes to the newly emerging field of the geography of sustainability transitions (cf. [Hansen & Coenen, 2015](#)), but might also be informative for policy-makers and public actors as well as actors from civil society who want to initiate a transition in their city or region.

The article is structured as follows: Section 2 specifies our concept on RTPS and possible sources of change on the micro-level. In the focus of section 3 is the methodological procedure and the development of a transition topology to chart a RTPS. The empirical results are presented in section 4, followed by a discussion and an outline of further research issues.

1.1. Sources of organizational and institutional change in regional transition paths to sustainability

Sustainability transition research has highlighted the need for a radical transformation of existing socio-technical regimes in order for society to develop in a more sustainable direction (cf. [Geels, 2004; Geels, 2011](#)).¹ From a regional or urban perspective it is the

challenge to implement and integrate multiple new sustainable solutions in different socio-technical regimes and adapt them to the specific local circumstances. The region can be conceptualized as an open system, which contains a wide range of socio-technical regime configurations that have developed in a co-evolutionary and place-specific way over time. [Rohracher and Späth \(2014\)](#) have shown that in order to initiate and stabilize transition processes in the region's socio-technical infrastructure, a broader organizational and institutional change in the regional system is necessary. Studies from the field of urban transition research show that these organizational and institutional changes are usually not targeted at a specific socio-technical regime, but strongly influenced by more general regional goals (as e.g. carbon reduction or economic growth targets) (cf. [Dielemann, 2013; Hamann & April, 2013; Higgins, 2013; Hodson & Marvin, 2010; Khan, 2013; Loorbach & Rotmans, 2010; Rohracher & Späth, 2014; Ryan, 2013](#)). Nevertheless, they pave the way for changes in many socio-technical regimes over the long run. We therefore argue that the emergence of the regional transition path cannot be fully explained with the niche-regime categories of the MLP (cf. [Block & Paredis, 2013; Rohracher & Späth, 2014](#)). Changes in RTPS are thematically broader, more complex and hard to capture. They do not only emerge in protected spaces, where heterogeneous actors are spared from prevalent institutional structures.

How actors use existing institutional settings for new purposes, or how institutions are re-combined and provided with new social practices, has not received much attention in the literature so far. Regimes are seen as relatively stable institutional settings, which have formed over a long time span and which guide actor's behavior. The plasticity and changeability of institutional settings through individual and collective actors are underestimated (cf. [Fünfschilling & Truffer, 2015; Quitzau, Stissing Jensen, Elle, & Hoffmann, 2013](#)). We therefore refer to recent approaches from evolutionary economic geography (EEG) that argue for a more differentiated understanding of path dependency, path creation and dynamics within established paths (cf. [Boschma & Martin, 2010; Strambach & Halkier, 2013; Strambach, 2010; Trippel & Tödtling, 2013](#)). The basic argument is that regional paths leave room for creative and reflexive actors at the micro-level to enact change (cf. [Strambach & Halkier, 2013](#)). “Path plasticity provides a certain scope for variation within a well-established institutional setting of a path. This characteristic of paths is rooted in the interpretative flexibility of institutions and incoherence of paths themselves due to the interconnectedness of institutional settings at different [spatial] levels.” ([Strambach & Klement, 2013: 69](#)). At the regional level actors are often involved in multiple regimes at the same time, which offers them many opportunities to combine or adjust existing institutional elements from peripheral regimes for new purposes. Due to proximity economies, institutional complementarities between different regimes in a regional system exist. These function as a stabilizing mechanisms, while they might at the same time be the source of multi-regime dynamics through initiating gradual change processes in other structurally connected regimes. Even if these change processes are not radical, but rather gradual at first, they do have the potential to lead to more fundamental changes over the long run (cf. [Mahoney & Thelen, 2010](#)). The latter underlines the argument that it usually takes a considerable amount of time until regional transition processes become visible at the macro-level.

In particular, sustainable innovations that require the combination of knowledge of actors from different institutional fields are often connected with path plasticity (cf. [Strambach & Halkier, 2013; Strambach & Klement, 2013](#)). Innovation processes aiming at sustainability, in which actors' ecological, economic and social needs and aims must be considered and balanced, necessitate complex

¹ For a detailed discussion about the concept of socio-technical regimes see [Markard & Truffer, 2008](#).

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