



A habitat for sustainability experiments: Success factors for innovations in their local and regional contexts



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ABSTRACT

The sustainability challenge requires various forms of experimentation with inventions, which may lead to an upscaling process in which the invention and its applications will spread to other users and regions in the world. However, many experiments fail. In this paper, we explore the success factors for sustainability experiments in their contribution to a longer-term regime change. These factors are related to the experiment itself as well as to the habitat in which the experiment takes place. A habitat is regarded as a configuration of contextual factors, which are mainly locally or regionally embedded. We introduce complementary insights from transition management literature and regional innovation systems literature to hypothesise that various types of experiments have distinctive favourite habitats, each with their specific success factors. Our exploratory survey among 56 sustainability experiments throughout Europe in the area of food, mobility and energy innovation suggests that user involvement is the most important success factor. Other important factors are the cooperation in local and regional networks, the policy instruments from the local and regional government, the dissemination of learning experiences, and the existence of a local or regional vision of the future. We conclude that entrepreneurs, users, local and regional governments as well as other regional partners should collaborate actively to make sustainability experiments more successful.

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1. Introduction

Sustainable development is one of the crucial societal challenges of our times. On a global scale, issues such as food security, poverty, climate change, water availability, and biodiversity demand urgent attention. On national and regional scales, food, mobility and energy systems can be greatly improved. To accommodate these challenges, however, transitions are needed, i.e. large-scale societal changes that take several decades to complete. An important element in the transition process is the experimentation phase. In this phase, inventions are tested in specific local and regional contexts. In society and policy, there are high expectations that successful experiments will stimulate both upscaling mechanisms and the economic viability of the innovations needed in the transition process. In this upscaling process, the invention is

improved and diffused to other locations and regions in the world, which may lead to the necessary transition. However, in reality these upscaling mechanisms often do not materialise. Worldwide, thousands of sustainability experiments have been carried out, but many have actually failed, i.e. they do not scale up (OECD & World Bank, 2014). There is a clear societal need to gain insight into the success factors of sustainability experiments in their contribution to upscaling towards a longer-term regime change.

Crucial for understanding both the success of experiments and upscaling opportunities are the conceptualisations of success and of conditioning spatial embedding circumstances. This paper wants to contribute to both these issues, using conceptually informed empirical research.

Complementary to the present transition literature, we introduce a broad definition of experiment success, distinguishing two dimensions:

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- a. success in the short term, i.e. whether the experiment achieves its short-term targets;
- b. success in the long term, i.e. whether the experiment contributes to upscaling to a longer-term regime change.

We introduce such a broad definition because both dimensions of success are probably linked: short-term success may trigger long-term success. Alternatively, we may learn from an experiment that fails to achieve its short-term targets but still contributes to a longer-term regime change.

In this paper we develop the notion that the experimentation phase in sustainability transitions is a crucial phase. In this phase (between prototype and upscaling), a prototype is made available, but it is not yet clear whether the innovation will scale up. We define upscaling of transition experiments as (i) an increase in the number of users and (ii) the embedding of experiments in the existing structures of the regime, i.e. perspectives, ways of thinking, routines, legislation and institutions (Rotmans and Loorbach, 2010). The increase in the number of users may occur either in the region in which the experiment has been embedded or elsewhere, given the cognitive understanding of innovation (Ponds et al., 2010).

Some transition management research focuses on the identification of the success factors for sustainability experiments. However, in this research tradition the geographical dimension is initially lacking. The geography is relevant because transition processes are unevenly distributed in space: they initiate in and diffuse to some places more than to other places (Hansen and Coenen, 2014; Boschma, 2005). By focusing on the success factors of an experiment as well as on the geographical context of the experiment (the habitat), we shed light on the hypothesis that local and regional environments potentially contribute to experiment success. Originally stemming from biology, we introduce the habitat concept in transition research to suggest that experimentation is carried out in co-evolution with its geographical context. In transition research, the process of co-evolution is well known (e.g. Schot and Geels, 2008), although not in a geographically explicit form. Furthermore, we suggest that various functional types of habitats may overlap in a geographical sense.

Our research question is the following: what are the major success factors, barriers and upscaling mechanisms of European sustainability experiments in their geographical context? A focus on the European dimension warrants the capturing of heterogeneity in local and regional contexts, such as institutional variations in structural change processes (Cortinovis et al., 2017) and variations in place-based and regional policies (Barca et al., 2012). We zoom in on the local and regional contexts across European countries, but we are interested in factors on all scales from local to global. Regions are a particular unit at which innovative experimentation occurs, because of for instance the (skilled) labour market and institutional and policy conditions. In this paper we focus on sustainability experiments in living labs, which offer promising preconditions for success. In relation to this, we focus on success factors contributing to upscaling towards a longer-term regime change. With respect to the upscaling mechanism, we focus on two aspects: the links with previous and the following experiments and the dedicated activities carried out in the experiment to promote future upscaling.

Scientifically, we aim at making an empirical contribution to the emerging field of the geography of transitions. We address the research gap on how the geographical context and scale matter in sustainability experimentation. From a societal perspective, this research is aimed at bringing relevant insights to the stakeholders involved in sustainability experimentation. These insights may be used to enhance the success of sustainability experiments in future.

2. Background

Several bodies of literature address topics relevant to answering our research question. We argue that it is necessary to combine insights from two different research fields: the transition management literature (TM), which addresses sustainability experiments, especially concerning strategic niche management (SNM), and the regional innovation system literature (RIS), which explicitly focuses on the geographical context of innovation. The combination of these two bodies of literature generates complementary insights.

2.1. Transition management

In the TM and SNM literature, two concepts are relevant to our research: the multi-level perspective and the multi-phase model. In the multi-level perspective, a novelty is created on the niche level (a novelty is called an invention in innovation literature). A transition process occurs if the novelty, which emerges on the niche level, enters the regime, spurred by changing landscape level conditions (Geels, 2002). We consider a niche a space where experimentation is carried out. However, the geographical dimensions of this space are not defined in transition literature.

The multi-phase model is different from the multi-level perspective, and describes the various phases in transitions. Experimentation and learning predominantly occur in the take-off phase. We are interested in the factors that facilitate the upscaling of experiments. These upscaling processes occur in the next phase, i.e. the breakthrough phase (Rotmans et al., 2001).

In the SNM literature, an experiment has a specific set of meanings related to the seeds of change that may lead to a transformation in the way in which human needs are met (Sengers et al., 2016). A sustainability experiment is sometimes also defined as a purposive and strategic intervention that explicitly seeks to capture new forms of learning or experience (Castán Broto and Bulkeley, 2013). In other words, sustainability experiments are focused on a future goal.

Experimentation and possibly subsequent upscaling are not simple linear processes. There is a high level of risk involved in terms of failure (Rotmans, 2005). Upscaling requires series of transition experiments in various niches (Raven et al., 2010). In these niches, various processes of nurturing and empowering are needed (Smith and Raven, 2012).

In the SNM literature, the success of a sustainability experiment is often defined as the increased possibility of scaling up the experiment in future (e.g. Kemp et al., 1998). This is the key challenge for sustainability experiments. As indicated in Section 1, we use a broader definition of success in this study.

An imitation of real-life conditions in so-called living labs may help sustainability experiments become successful. Such labs offer beneficial preconditions (i.e. user involvement, real-life settings and a formal evaluation) to advance transitions (Almirall and Wareham, 2008; Schliwa and McCormick, 2016).

In practice, we observe that individual experiments are not isolated events, but build on each other over time. Geels and Raven (2006) conceptualise how the local outcomes of an experiment are transformed into generic lessons by aggregation activities, in which conferences, workshops and journals and so on play a role (see Fig. 1). For these aggregation activities, intermediary actors at the community level (e.g. branch organisations) are important (Geels and Deuten, 2006). In such a 'learning trajectory' there may be an individual project that fails. Still, a failing project may constitute a positive contribution to an overall learning trajectory (Geels and Schot, 2010).

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