

Towards a governance of sustainability transitions

Giving place to individuals

Felix Rauschmayer¹ Tom Bauler² Niko Schöpke³

*¹Helmholtz Centre for Environmental Research – UFZ;
Felix.Rauschmayer@ufz.de*

²Université Libre Bruxelles

³Leuphana University Lüneburg

Abstract

Policies for sustainability transitions necessarily have three main characteristics: they are prescriptive with regard to dynamic societal processes, linked to the normativity of sustainable development, and are able to interlink both the societal and the individual levels. Taking transition management as a starting point, the paper elaborates that it cannot well address the second and third characteristic. We therefore suggest complementing transition management approaches with the individualistic capability approach and the more structural practice theory. We suggest a heuristic combination that places individuals back into the study of sustainability transitions and show with three suggestions how this might change research on and for transitions. Firstly, we propose to assess sustainability on individual, niche, and regime level; Secondly, we show that the crucial learning processes occurring in the transition processes can be better understood when interrelating the three levels; Finally, we elaborate that the governance of sustainability transitions necessarily has – at the same time – to foster free spaces for experimentation and to select those niches that are conducive to more instead of less sustainability.

Introduction

There are multiple on-going attempts to develop the necessary scientific knowledge to enhance policies for sustainability transitions, i.e. knowledge that supports the development of policies that further the fundamental changes needed in our societies for a shift to sustainable development (e.g. WBGU 2011, Shove and Walker 2007, Rotmans et al. 2001, Loorbach 2007). Considering however these scientific attempts' relatively weak performances in effectively supporting change on larger scales, it might well be assumed that these attempts remain incomplete, if not inaccurate. In the present paper we will identify which central elements are neglected in three of the most prevalent approaches that are currently used to scientifically ground the governance of sustainability transitions. We purport that these three approaches are actually a combinable set of approaches, which become in our understanding a promising bundle to ground a more effective and large-scale governance of transitions.

Sustainability transitions comprise a series of analytical tensions, the occurrence of which raised our curiosity. Consider, for instance, the following tension between the societal and the individual levels. Sustainability transitions have been defined as fundamental society-wide modifications that target on changing everyday behaviour of citizens/consumers. However – quite paradoxically – behaviour can only to a small part be explained as outcome of individualistic and rational decisions (Røpke 2009), but are rather enshrined in societal practices. In parallel, sustainability transition policies are inherently normative. Even though neither the objective nor the process of particular transition experiments and dynamics are pre-defined, hence they are meant to navigate in a space which is not defined by the normative stances of the initiators of the transitions, a governance of transitions can not avoid sustainability (i.e. intra- and intergenerational justice) as its overarching target. Most concepts of justice, though, are – as most normative ideas – individualistic in the sense that it is the improvement of an individual's condition that the implementation of the justice concept is evaluated against. By extension, sustainability transitions are thus societal phenomena targeting to improve (inter- and intra-generational) justice at societal level, but which is measurable only at an individual's level.

As a consequence of these tensions, we argue that transition governance should be conceptually enriched in order to be able to relate to both, i.e. the societal and the individual level. It is precisely the conceptualisation of this bridge between individual and societal levels which we want to explore in the following paper. Developing policy-relevant knowledge clearly is a prescriptive task that can neither be based exclusively on description, nor on pure normativity (Bell 1988). Therefore, scientific advice for sustainability transition policies has to explain how societal transitions happen and how precisely those transitions can be selectively supported which strengthen sustainable development.

We present three different heuristics that we purport as being complementary with respect to their strengths and weaknesses and sketch how these could be conceptually linked to each other. (1) Transition Management (TM) has its focus on enhancing societal transitions towards sustainability and advises policy makers on how to encourage the building-up and mainstreaming of niches. As a heuristic TM is clearly prescriptive. (2) The Capability Approach (CA) aims at assessing the enhancement of social justice based on human well-being, and strives to account for the interaction of societal and personal factors and a motivational mix. As a partial theory of justice (Sen 2009), the CA clearly is normative. (3) Practice theory (PT) disentangles human action as resulting from the interaction between meaning, material, and skills. PT provides us with the analytical capacity to develop a reading at meso-level of how change occurs and evolves, and as such is inherently descriptive.

In other words, our attempt is to ground the prescriptive governance of normatively-defined transitions on a rich description of change(s). We implicitly argue that the strengths and weaknesses of these three heuristics – CA, TM and PT – can be fruitfully combined into a meta-heuristic which will allow to re-situate the individual into the conceptualisation of societal transitions and which will help to address the normativity-gap of current TM-approaches. Considering that none of the three approaches are considered as being fully elaborated theories, we refrain from a discussion of these three approaches in their full theoretic depth: we rather use them as a three-folded heuristic basis which allows us to develop an enriched (meta) heuristic of transition governance.

Contrasting their respective strengths, each heuristic has blind spots, too: (1) TM fails to distinguish the normative content of sustainability transitions, has no concept of the individual engaging in transitions, and a perhaps naïve understanding of the power of niches for the mainstream. (2) The CA has, in its core, remained a static concept of well-being analysis; herewith, it is not apt to deal with societal dynamics and even less with prescriptively induced transitions. Furthermore, the CA – being individualistic in its fundamental perspective – has no

theory of the societal which makes it ill-suited to handle societal issues such as policies for sustainability transitions. (3) PT, finally, describes changes in practices as complex processes, which makes it difficult if not impossible to identify leverage points for changes. Moreover, PT – being in opposition to individualistic models of human behaviour – has difficulties in integrating aspects of human freedom as they are expressed, for instance, in conscious decisions. PT has hardly a normative dimension – it may therefore not distinguish whether a practice is more or less sustainable, or if a transition is a good or a bad thing to happen. PT fundamentally argues to understand societal evolutions as resulting from the deep entanglements of many factors and conditions, and does therefore offer little insights on the identification and ordering of those factors, conditions and levers, even while the identification of such interrelationships would in the end facilitate to use PT for policy-making.

Our paper is structured as follows. We will first present each of these three approaches at a glance, emphasising those parts that are particularly fruitful to our argument of interlinking. Then, we elaborate how a combination of these approaches can achieve three tasks that science for sustainability transitions should achieve: (1) assess niches and mainstream practices on their contribution to the societal aim of sustainable development, (2) address how social learning can change individual motivations and social practices, and (3) support the mainstreaming of sustainability-enhancing niches.

Theoretical background – taking a glance at the heuristics

Transition Management

Transition studies and sustainability transitions

Rotmans and Loorbach define transitions as radical, structural changes of societal (sub)systems (2009: 2). Following Rotmans, Kemp and van Asselt (2001, p. 16), transitions “can be described as a set of connected changes, which reinforce each other but take place in several different areas, such as technology, the economy, institutions, behaviour, culture, ecology and belief systems”. Transition research, aiming to develop analytical tools that take into account the complexity of societal systems and their mechanisms of innovation, combines innovation studies, history, and ecology with sociology, political and governance studies as well as psychology (Wittmayer et al. 2013). In more detail, Markard et al. (2012, p. 955) distinguish four different theory strands of transition studies: technological innovation systems (e.g. Bergek et al. 2008), the multi-level perspective (MLP) on socio-technical transitions (e.g. Geels & Schot, 2007), strategic niche management (Kemp et al. 1998) and finally transition management (e.g. Loorbach, 2007; Rotmans et al. 2001). The first two aim at analysing and describing transitions as processes of radical and structural change focussing on transition dynamics. The latter two are rather prescriptive and focus on issues of agency and how actors (can) influence transformation processes, yet including insights on transition dynamics, too.

The multi-level perspective, as a shared analytical concept, differentiates three levels to analyse changes: the landscape (macro level), the regime (meso level) and the niche (micro level) (Rip & Kemp 1998). The regime, as the underlying societal structure, can be understood as “a conglomerate of structure (institutional and physical setting), culture (prevailing perspective), and practices (rules, routines, and habits)” (Rotmans and Loorbach 2009: 2). A niche is built up by a small group of actors differing from the regime and is a place where radical innovations may occur (Geels & Schot 2007: 400). The landscape in turn is thought of as the exogenous context, which is hard to influence, like e.g. global trends (climate change, urbanisation) or globally shared norms (human rights) (Schneidewind & Scheck 2012: 49).

Changes in societal systems do appear frequently; they can be slow and small, or fundamental and operating at fast speed. However, with respect to orienting our societies onto a sustainability pathway, the prevailing changes are too incremental and slow, hence are not

considered substantial enough by many scholars to cope with today's sustainability challenges (Markard et al. 2012: 955). "The MLP proposes that transitions, which are defined as regime shifts, come about through interacting processes within and between these levels. Transitions do not come about easily, because existing regimes are characterized by lock-in and path dependence, and oriented towards incremental innovation along predictable trajectories. Radical innovations emerge in niches, where dedicated actors nurture alignment and development on multiple dimensions to create 'configurations that work'" (Geels, 2010: 495). Transitions, as shifts of the regime, happen due to three basic reasons: top down, when landscape developments put pressure on the regime to change; bottom up, when niches scale up and become dominant; and, third, when learning processes at the regime level lead to an integration of innovations from the niche level into the regime (Rotmans & Loorbach 2010: 137 f).

With regard to sustainability transformations, i.e. radical transformation towards a sustainable society (Grin et al. 2010), the situation is even more difficult: even when there is a radical, structural change, historical studies of transitions have shown that these often not have led to a more sustainable society (Rotmans and Loorbach 2009: 2). Sustainability transitions require a fundamental change in the structures, cultures, and practices of a societal system for the system to become (more) sustainable (Frantzeskaki and Haan 2009). Rotmans et al. (2001) refer to the fostering of sustainability transitions as transition management.

Sustainability transitions and transition management

Transition management (TM) is an explorative and participatory process addressing 'persistent' or 'wicked problems' and searching for long-term sustainable solutions (Rotmans et al. 2001, Loorbach 2010). 'Persistent problems' are based on failures of societal systems, which can only be overcome by a restructuring of these systems, i.e. a transition (Rotmans & Loorbach 2009). Following Loorbach, the TM framework provides the basis for manage transitions in an operational sense: it is "flexible enough for adaptation but prescriptive enough to be functional in practice" (Loorbach, 2010: 172). Following Wittmayer and Schöpke (2013), TM is based on action research (Loorbach et al. 2011), as well as on other research approaches such as Integrated Assessment (Rotmans 1998), Post-Normal Science (Ravetz 1999) and Sustainability Science (Kates, Clark et al. 2001). It puts forth a number of prescriptive tenets to manage complex systems (e.g. Loorbach 2007).

Rather than assuming that societal change processes can actually be 'managed' as the name implies, transition management holds that sustainability transitions cannot be governed in a regular way. Due to their open-endedness, non-linearity and uncertainty, sustainability transitions require an iterative, reflective and explorative way of governing aimed at societal learning (Frantzeskaki et al. 2012, Loorbach 2010). Transition management is such a reflexive governance approach. It can be understood as "a multilevel model of governance which shapes processes of co-evolution using visions, transition experiments and cycles of learning and adaptation. Transition management helps societies to transform themselves in a gradual, reflexive way through guided processes of variation and selection, the outcomes of which are stepping stones for further change. It shows that societies can break free from existing practices and technologies, by engaging in co-evolutionary steering." (Kemp et al., 2007, p. 78) (cp. figure 1). Transitions need to be directed towards sustainability, although sustainability is never a given but always the outcome of negotiation, debate, competition and experiment. (Loorbach 2007: 80). Hence, quality criteria regarding the process are considered more important for sustainable development than pre-defined understandings or end-states (ibid.).

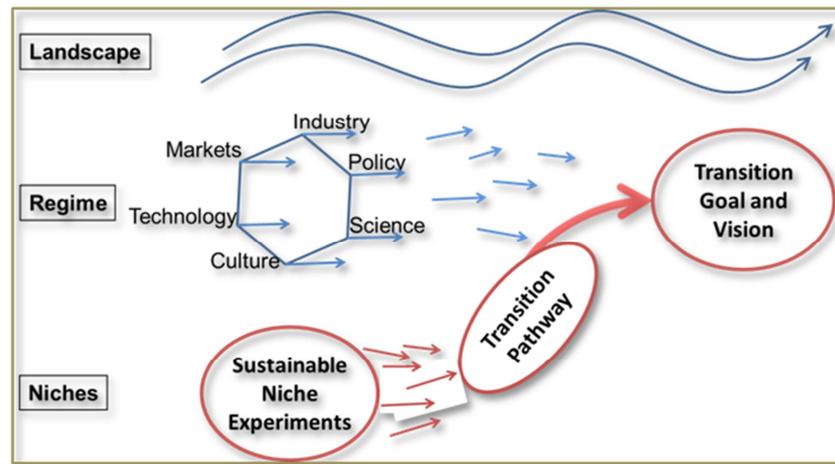


Figure 2: Multilevel perspective on sustainability transitions (changed from Geels and Schott 2007)

As radical innovations in niches are core sources of possible radical system changes, they play a central role in transition management. TM aims to provide space and resources for experimentation at a sufficient distance from the dominant regime which shall empower niches and allow for the development of alternatives (Avelino 2011, Loorbach 2010: 168). A diversity of niches built up can together create an alternative regime (Rotmans & Loorbach 2009: 5). “The ultimate goal of transition management should be to influence and empower civil society in such a way that people themselves shape sustainability in their own environments, and in doing so contribute to the desired transitions to sustainability” (Loorbach 2007:284).

While TM can build on existing niches, its specificities are highlighted even more when TM is used to create transition arenas and develop them further to influence the regime (cp. figure 2, Loorbach 2007, 2010). In the TM process, a group of individuals (called frontrunners) come together in a series of meetings to agree on a problem description, formulate guiding principles for a sustainable future, and determine pathways for how this vision is to be achieved. In a first step therefore a transition team, as an interdisciplinary group of researchers, is built to analyse and prepare a transition management process (cp. Figure 2). The actual starting point in a TM process (step 2 in figure 2) is to structure or reframe an existing societal issue in a way that allows for a deep and integrated understanding of problems by all involved (Wittmayer & Schöpke 2013). This is done by the frontrunners, who, together, form the transition arena. These frontrunners are not selected due to principles of representative participation, but with regard to their possible contribution to a process of radical transformation. Therefore criteria for their selection are: willingness to learn, openness for innovation, ability of complex thinking, authority in their community, ability to look beyond disciplinary boundaries, as well as ability to establish and explain visions of sustainable development within their own networks (Loorbach 2010). Based on the shared understanding of the present, a common sustainable future is imagined for the system in question, e.g. a city, a sector or a region (Loorbach & Rotmans 2010). Building on this vision, possible pathways to realize it are explored, and concrete steps for the realization are backcasted. Thereby long-term vision and short term actions are connected into a transition agenda (step 3). In a next step (step 4), frontrunners start short term actions and experiments to realize the developed vision.

Building up a broadening network of diverse actors that engage in the debate, thinking and experimenting, creates the conditions that allow for the formulation, up-scaling and possibly even the breakthrough of innovations (last step in figure 2). The whole process is constantly monitored and evaluated by the transition team.

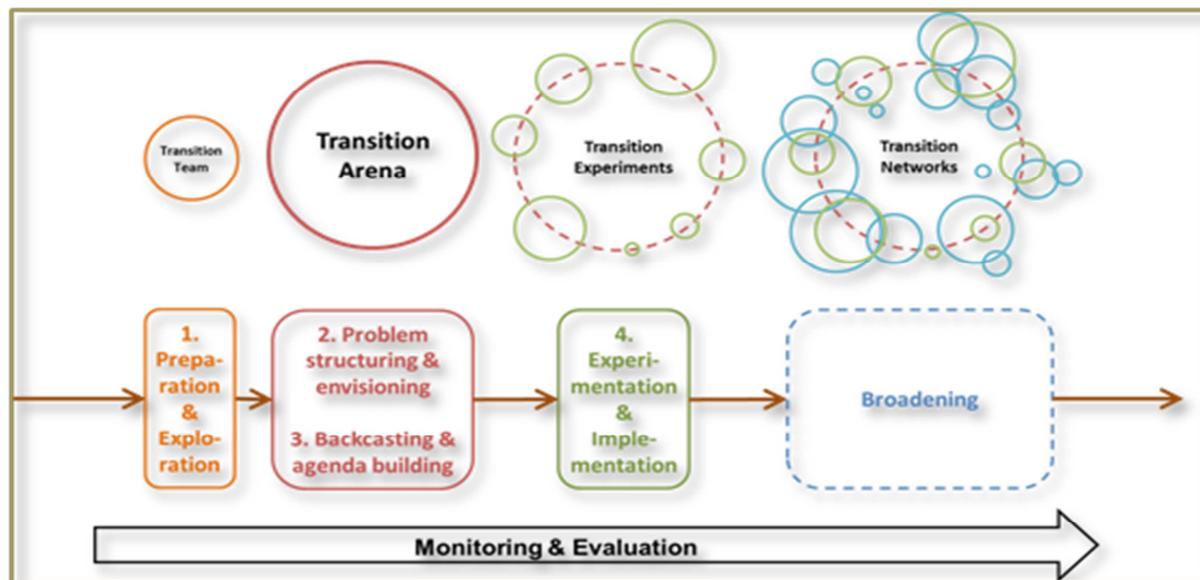


Figure 3: Transition Management process (Wittmayer 2013 referring to Roorda et al. 2012)

By implementing TM in a structured action research process, new insights emerge on individual and societal levels and are implemented and reflected upon in a continuing process (Wittmayer et al. 2013). The objectives of the transition arena “should be flexible and adjustable at the system level. The complexity of the system is at odds with the formulation of specific objectives and blueprint plans” (Loorbach 2010: 167). The developed vision and agenda always need to be adapted to new insights and development during the transition process. Therefore TM avoids a too early selection of innovations and keeps options open to learn about alternatives before selecting (Rotmans & Loorbach 2009: 6). This allows for an adaptive, open and participatory process of vision development, which at the same times shall contribute to sustainability.

Although TM has concrete impacts, e.g. the implementation of the agenda agreed in the arena, one major aim is the facilitation of collective and individual learning which leads to changing discourses and related attitudes of (dominant) actors (Loorbach & Rotmans 2010). There are different forms of learning discussed, all of which are supposed to include a lasting change in the interpretive frames (belief systems, cognitive frameworks, etc.) guiding the actions of a person (Grin and Loeber 2007; Grin et al. 2010; cp Wittmayer et al. 2013). A basic differentiation is done between first and second order learning: first order learning is based on gaining new knowledge, while underlying assumptions, values and identities remain the same (Argyris and Schön 1978; 1996). Second order learning is considered to be most relevant in transition management (Wittmayer et al. 2013). It involves learning processes including changes in fundamental values and assumptions. These learning processes are at the basis of fundamental change and adaptation processes and allow dealing with complexity and uncertainty, e.g. through collaborative action and dialogue (e.g. Schein 1993; Garmendia & Stagl 2010). Second order learning is assumed to be one possible precondition for voluntary intrinsic behavioural change (Wittmayer et al. 2013). Grin and Loeber (2007) see a) surprises, b) outside views, and c) safe spaces as the most important stimuli for second order learning. Learning and concrete actions in turn are connected: ‘learning-by-doing’ and ‘doing-by-learning’ (Loorbach 2007: 81).

Strengths and weaknesses of transition management for sustainability transitions

The challenge explored in this section is to analyse to which degree TM addresses the challenges of sustainability transitions i.e. that are prescriptive, linked to the normativity of sustainable development, and are able to interlink both the societal and the individual levels.

1. TM aims at structural, societal transitions and has been practiced in a variety of policy fields (Avelino et al. 2012, Verbong and Loorbach 2012), on regional and urban scales

(Roorda et al. 2012, Wittmayer et al. 2011) in the Netherlands and beyond. It focuses at enabling radical changes of societal systems, building on an understanding of the interplay between different levels of societal structures.

2. TM furthermore provides an interventionist approach building on empowering alternative niches as it translates descriptive knowledge of complex systems development into tenets and instruments of transition governance. In linking theoretical knowledge and practical engagement when enabling transitions (Rotmans & Loorbach 2010: 140 f.), it goes beyond traditional understanding of sciences.
3. As one of its major contributions, the TM framework provides the basis for managing transitions in an operational sense. The transition management cycle and the transition arena methodology allow undertaking concrete management steps, that are “flexible enough for adaptation but prescriptive enough to be functional in practice” (Loorbach 2010: 172).

Nevertheless, criticisms of TM led to a productive scientific dialogue and an emerging stream of critical transition researchers (Jhagroe 2011, Avelino 2011, Jhagroe & Wijsman 2011, Eshuis, et al. 2012, Van Steenberghe & Wittmayer 2012, Wittmayer 2012, Jhagroe & Frantzeskaki 2012). With regard to the challenge of this paper, we identify 3 major blind spots.

1. TM does hardly deal with questions of power. TM has been met with critiques with regard to issues of power, politics and democratic legitimacy (Shove & Walker 2007, 2008, Duineveld et al 2007, Smith & Kern 2008, Smith & Stirling 2008, Hendriks 2007, Meadowcroft 2007). E.g. Shove and Walker (2007: 764ff) argue that too little attention has been paid to the processes of negotiation of the goals. “Stakeholder selection and power dynamics highly influence the goals and visions and undermine the assumption of shared societal and environmental goals” (Feiner & Wesely 2012: 3). Duineveld et al. (2007) are concerned by researchers having a ‘double role’ which can be prone to obscuring the analysis (Duineveld et al. 2007) as well as to possessing definitional power on how issues are framed in the participatory process (Avelino 2011). Although an empowerment of niches and frontrunners is a core aim of TM, it remains unclear what exactly is meant by this empowerment and what it can be built upon (ibid.).
2. TM falls short of distinguishing the normative orientation of change. TM is claimed to be “explicitly a normative model by taking sustainable development as long-term goal” (Loorbach 2009: 163). Rotmans and Loorbach furthermore recognize that this explicit normative orientation is crucial, since past transitions would often not have led to a more sustainable society (Rotmans & Loorbach 2009: 2). Despite of focussing explicitly on sustainability issues, the TM concept has witnessed critique of its understanding of sustainable development as being rather blurred (e.g. Smith & Sterling 2008, Smith & Kern 2008). As the transition management methodology puts the concrete definition and valuation of sustainability in the hands of the participating frontrunners (Rotmans & Loorbach 2009: 10), a more substantial definition of sustainability cannot be found in TM literature. The approach neither describes how frontrunners get confronted with the normative concept of sustainability nor does it propose methods to assess sustainability visions developed by participants against more scientifically grounded understandings of the approach. This may lead to sustainability becoming completely negotiable, and therewith random, at niche levels.
3. TM neither has a clear concept of the individual engaging in transition experiments nor a basis for assessing changes occurring within the individuals. Although TM focuses on participation of so called frontrunners, and social learning is a major aim of it, it has no clear concept of why and how individuals engage in these transition experiments in terms of a psychologically founded behavioural or learning model. Since the participating frontrunners are essential to develop innovations with regard to strengthening sustainability, a concept of the individual should include – besides the

characteristics cited above – questions of values, motivations and reasons for action. This extended focus might help to assess intra-individual changes with regard to sustainability awareness or motivation prompted in the learning processes facilitated in the TM process¹.

In the following we present the capability approach, which – in its core – is a normative and individualistic approach and therewith may provide further insights on the last two blind spots.

The capability approach

The capability approach: normative and individualistic

The capability approach (CA), as developed by A. Sen and others, has been designed as a model to measure human development differently than by relying on resource availability (e.g. such as income), basic needs' fulfilment (e.g. such as food, shelter), or subjective well-being (e.g. such as happiness). It rather is an individualistic approach (cp. Robeyns 2005), but uses a model of humans that is more open than the mono-dimensional model of homo oeconomicus currently underlying many social sciences (cp. Ingebrigtsen & Jacobsen, 2009). First, the CA can be differentiated from resource-oriented approaches as it considers that resources, although important, do not determine what constitutes human development or flourishing, because people differ in their abilities and possibilities to use an identical amount of resources. Secondly, the CA differs from basic-needs approaches: although fulfilment of some socially determined basic needs is important, needs differ from person to person and the freedom to decide which needs to meet how is an important well-being factor for each of us. Thirdly, the CA is not merely subjectivist: subjective well-being is important, but (a) sometimes, people adjust their life to low levels of objective standards of living, and (b) it is part of our human agency to also want to do something that does not only contribute to our, but also to others' well-being.

The CA gives overriding value to the substantive freedom of each individual to live a life one values or has reason to value, defined as capabilities. Capabilities depend on the availability of resources, but also on the personal ability to use those, as well as the social and environmental factors enabling such use (cp. figure 3). Understanding the freedom to live a valuable life as the basic quality of life, the CA offers both, a structure to better understand what individuals require in order to lead a valuable life as well as a framework to evaluate whether policy measures or societal developments such as sustainability transitions contribute to enhancing the freedom of people. The CA does take it for granted that individuals are not only motivated by enhancing their own well-being through improving their standard of living or that of their family and friends, but that people also commit themselves to enhance the well-being of others (Sen 1987). This openness to pro-social motivation (and behaviour) is important in the sustainability discourse, as sustainable development essentially is about intra- and intergenerational justice.

In each of the categories, well-being and commitment to other goals, the CA takes multidimensionality of human goals and realizations for granted. In both motivational categories, it is relevant for individuals which of their goals they can realize (or, in the language of the CA: which functionings they can achieve), but also, whether they have the real freedom to choose among different goals (or: whether they have a large capability set). Resources are a basis for this freedom, but the capability approach pays attention to the personal, cultural and environmental conversion factors that humans require to convert resources into freedoms. An example of personal mobility could illustrate this concept along figure 3: Cycling to work as an achieved functioning could be a realization of a goal of own health, but could also meet other-regarding aims taking into account the bike's CO₂-neutrality, silence etc. Cycling to work requires certain resources (first of all: a bike) and is enhanced by the conversion factors such as

¹ This would also contribute an answer to Loorbachs' call, that transitions need to include new "societal systems that combine freedom of individual development and innovation with (selection) criteria related to collective goods and future developments" including processes of "changes in perceptions, routines, practices and beliefs at the level of individuals" (Loorbach 2007: 81).

gender norms (e.g. allowing women to use bikes), traffic culture (e.g. in Copenhagen or Amsterdam), protective regulations, and by an appropriately moderate climate and land profile. Political measures aiming at promoting the use of bicycles herewith can therefore increase individual freedoms to meet goals of personal and others' well-being in different ways than just by focusing on resources. At the same time, forcing everybody to go by bike would restrict the capability set and herewith lower personal freedom.

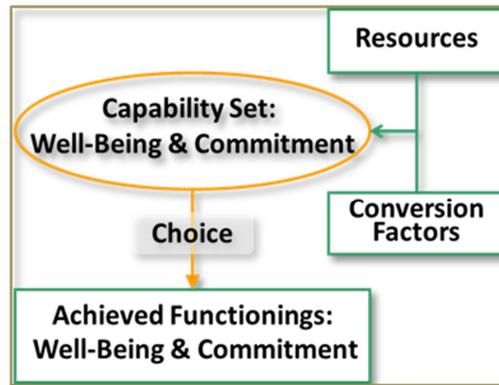


Figure 4: A simplified representation of the capability approach

This implies that real freedom includes the availability of resources, i.a. environmental assets (Polishchuk and Rauschmayer 2012), but also social institutions, individual skills etc. to convert these resources into capabilities. Herewith the capability approach is a means to structurally define the idea of a good life in a culturally and historically independent way (cp. Giulio, Brohmann et al. 2012). This structure can be used to specify a good life non-paternalistically in concrete situations as shown by the example of personal mobility above, but it can also be mobilized for conceptions of justice and can herewith be useful for conceptualising sustainable development (Ballet et al. 2011, 2013, Sen 2013, Rauschmayer and Lessmann 2013). In this sense, intra- and intergenerational justice can be measured by capabilities instead of using subjective metrics, such as pleasure or preference, or objective metrics, such as income or access to other resources² (Gutwald et al. 2011). Practically, though, this encounters the problem of operationalization: what exactly are the valuable dimensions of human well-being? Are there thresholds? Are the dimensions (partially) commensurable?

Sen and Nussbaum have developed different versions of what is called the capability approach (cp. Sen, 1985; Nussbaum, 2011). Sen and Nussbaum agree that the evaluative space of what is valuable for human life, i.e. the goal of public policy, is multidimensional. While Sen does not define these dimensions (he argues that this should only be done in context-specific democratic deliberations), Nussbaum has – in a preliminary consensual process – defined a list of fundamental capabilities which she thinks is essential for any good human life and which any government should guarantee for its citizens³.

Strengths and weaknesses of the capability approach for sustainability transitions

The challenge explored in this section is to analyse to which degree the CA addresses the challenges of policies for sustainability transitions i.e. that are prescriptive with regard to dynamic societal processes, linked to the normativity of sustainable development, and are able

² Within the current sustainability indicators, nearly only environmental indicators deal with intergenerational aspects. They are motivated by resource-views (ecosystem goods), but also concern environmental conversion factors (Polishchuk and Rauschmayer 2012). Social and individual conversion factors are rarely represented as sustainability indicators.

³ According to Nussbaum (2000, 2011), the ten central capabilities refer to: life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play and control over one's environment.

to interlink both the societal and the individual levels. Here, the CA's main attractiveness might result from its clear stance on normativity: its aim is to foster human flourishing, conceived of as an enhancement of individual capabilities. In this sense, capability-based assessments have been widely used to monitor societal achievements. The most prominent example for its evaluative use is the World Development Index, but the CA has also been used to measure inequalities due to gender, age, or education (Lessmann 2012). The CA can also be used prospectively, i.e. to predict effects of specific measures on human development. CA provides a quite straightforward analytical avenue to sustainable development, i.e. development aimed at human flourishing of all current and future people (e.g. Sen 2013). This first-level understanding is however not without problems when analysed more sharply (Lessmann and Rauschmayer 2013). When measuring sustainability achievements at two points in time, the capability-based assessment approach is, in principle, able to discriminate between sustainable and unsustainable developments.

On the other hand, the use of the capability approach for sustainability transitions encounters several drawbacks:

1. As an evaluative concept, the capability approach is limited to comparative statics. Herewith, it cannot capture the highly important dynamic and reflexive processes happening during sustainability transitions.
2. The CA has no theory on societies, governance, group deliberations, etc. The importance of public discourse (Alkire 2006) as well as the interdependencies of individual capabilities (Drèze and Sen 2002) have been acknowledged, but the capability approach essentially remains a normatively, methodologically, and ontologically individualistic approach. For the moment, the CA only has a very rough (and controversial) understanding of collective capabilities (e.g. Ibrahim 2006), misses hence an understanding how the interaction of individuals in groups creates capabilities that can enhance the flourishing of each member in a way that could not have been achieved without this interaction.
3. The CA is based on the assumption that individuals decide consciously and individually on their behaviour – it neglects more structural approaches that see individual behaviour much more as a result of structural forces than of conscious individual decisions (cp. Shove 2010 on her critique to individualist behavioural models – see next section).

These factors make the CA unsuitable to deal with aspects of societal transitions to sustainability. In particular, the three flaws make it difficult to deduce prescriptions for societal processes from an analysis based on the CA alone. At the same time, and in sharp contrast to practice theory, the CA allows predictions of well-being effects. CA furthermore offers an approach to justice and normativity that is richer than most other approaches used in social sciences and closer to operationalization – notably for evaluations and assessments of individuals' trajectories - than most other philosophical approaches to justice (such as Rawlsian theories of justice – Sen 2009).

Practice Theory

Practice theory in short: a change in focus

When calling for change and transitions in contemporary societies, a rather straightforward question is: change of what exactly? While it is the outcomes of our human activities – be it in terms of pollution, emission or health hazards – that are obviously targeted in a results-based approach, it is more difficult to find an answer when we look at the generators of these outcomes: Is it individuals, societies, or something else that generate the outcomes? Classic socio-economic approaches invoke basic aggregational principles and conclude that if the necessary change is recognized to be societal, then the analytical foci are those individuals that compose a society. It is thus individual behaviour which should be taken as the correct analytical

unit of change. However, the more progressive approaches – even in the realm of economics (e.g. see evolutionary and ecological economics) – have since long critiqued the focus in economics onto individuals, and be it only because such a focus has all too often implied to accept the existence of certain forms of individual rationality as being explicative of societal dynamics. Practice theory (PT) has been developed to bridge individualistic (*homo oeconomicus*) and structural (*homo sociologicus*) approaches (Reckwitz 2002); it sees human behaviour as being embedded in a conjunction of individual, structural, cultural, and technical elements. This modification of the analytical focus onto the level of integrative (Schatzki 1996) practices allows accounting for the change in configurations of material, cultural and socio-economic items that define daily life (Southerton 2009) as well as routinized doings. Besides of this theory-based argument, individuals tend to see their life as being composed of a series of interrelated practices such as cooking&eating or moving&travelling, instead of a set of behaviours as consumers or as choice agents; a fact which Røpke (2009) sees as a major argument to employ that very filter of reading for analytical work too.

Applying a practice focus on societal transitions allows de facto to describe the occurring change as a co-evolution of innovations in material artefacts, socio-economic conditions, organisational and institutional re-configurations, but simultaneously to account for evolutions in collective and individual values, moral interpretations, lifestyles, social capital, body activities, emotions, knowledge (Shove et al. 2012; Reckwitz 2002). In this sense, practice theorists and scholars might be particularly well equipped to investigate transitions that go beyond the introduction of mere technological innovations, and which encompass a profoundly socio-technical reading of contemporary societies.



Figure 5: The three elements of practices (inspired by Shove 2003)

At least since Warde (2005), practice approaches have become the reference in consumption studies, notably because they can be very explicative of what consumers do, say, think they do, say they do, mean to do. Shove (2003) has equally brought practice approaches to some prominence with extensive case-study work in the area of consumption studies. Her description of the evolution of cleanliness, hygiene and comfort shows the profoundness and richness of understandings which can be gained from observing and translating everyday practices over time and space, and by accounting properly for the meanings, skills and artefacts that ground practices (cp. figure 4). In effect and by definition, practices are neither homogeneously distributed over a society, nor identical from one individual to another, nor consensually perceived as such. Problematic for case study work then is the definition and delimitation of what a practice actually is, and Reckwitz's (2002) heuristic approach that "practices exist as provisional but recognizable entities composed of recognizable conventions, images and meanings; materials and forms of competence" does not necessarily provide an operational blueprint to proceed to classification and identification work. Indeed, while some authors (Spaargaren 2003, Southerton et al. 2004) apply a very broad categorisation of (social) practices (e.g. eating, sleeping, moving), others use practices as a heuristic while working on relatively

confidential alternative phenomena (e.g. vegetarianism, collaborative sharing). Additionally, on theoretical level, Schatzki (1996) introduced dispersed practices to account for generic (horizontal) behaviour in societies such as for instance consuming, contemplating or explaining. Shove introduces bundles and complexes of practices to account for either loose “co-location and co-existence” (2012: 17) or the more integrated and “co-dependent” (2012: 17) aggregation of practices into peoples’ lifestyles. This aggregational conceptualisation can be of particular interest if – as in the present case – the interactions between the regime (of social practices) and whole bundles (or complexes) of alternative niche practices are explored.

Strengths and weaknesses of Practice Theory in the light of sustainability transitions

The challenge when thinking PT in the light of transitions is to analyse to which degree practice approaches can address the main challenges of governance of sustainability transitions i.e. be suitable for prescription and notably with regard to dynamic societal processes, be linkable to the normativity stance of sustainable development, and be able to interlink both the societal and the individual levels.

Inserted in their particular web of meanings, skills and artefacts (Shove 2003), practices change over time and are diffusing over space. Practice approaches reveal complex pictures of the entanglement of everyday life. The paradoxical downsides of this being that practice approaches have difficulties (Warde 2005) to accurately account for change; more precisely, to identify the sequence of what change in meanings (or skills or artefacts) preceded or even cause what evolution in skills (or meanings or artefacts). Causalities or consequential delimitations are rather impossible to be recognized from practice work. Most operationalizations, including work by primary scholars in practice approaches (e.g. Shove and Walker 2010), mirror this very difficulty by the fact that their descriptive work is only shallowly usable to deduce any form of interventionism or governance approach or prescription. This does not mean that the question of the steering or governance of practices is not seen as being a primordial one; quite the contrary, as many of the current practice scholars are very actively trying to investigate this space. To give an example of the problems they face: while it is rather easy to observe the changes in the intimate cleanliness-related practices of bathing, showering and flannel-washing (here referring to its main artefacts), PT does not allow ‘predicting’ which policy intervention on which aspect of the entangled elements of the practice might be successful to lower the CO₂-emissions due to those cleanliness practices. With respect to our investigation into transitions and their governance, such a fundamental difficulty provides actually for an entry point to link practices with transition management approaches, which are per definition oriented towards interventionism.

On a second level, practice approaches reveal inherent difficulties when used to conceive assessments of the sustainability of practices. While it is rather straightforward to assess and rank the practices of bathing, showering and flannel-washing according to the CO₂-emissions related to their use of hot water, this may already be different in terms of their complexities when referring to these practices’ embeddedness in other practices (e.g. urban living) or when attempting to assess climate-impacts of the wider practice (e.g. of cleanliness). A much wider difficulty lies however in the fact that Practice approaches can, e.g., observe and describe the societal shift to more frequent leisure flights along the different skills, artefacts, and meanings related to this change in practice. However, PT will neither be able to assess the effects of these multi-dimensional changes on the well-being of the people effectuating this shift in their practice, nor on the well-being of the world’s poor or future generations. Under no circumstances could it be said that participating to ‘more’ practices would be better than being involved in less, nor whether more conscious participation to practices would be better than a totally passive induction of practices. With other words, it will be impossible to judge the impact of measures targeting a shift in practices against criteria stemming from intra- and intergenerational justice precepts.

In the end, PT can contribute to improve our understanding of sustainability transitions by providing a framework which we can use to produce a more complex picture of everyday changes that are lived by individuals but develop into some form of coherence (and hence, their *raison d'être*) only at the societal level. However, PT has no normative standpoint – it may therefore not be easily used to distinguish whether a practice is more or less sustainable and whether a change in practices is conducive or not to more human wellbeing. As it rather highlights the complexity of human behaviour, practice approaches cannot be used to deduce proposals for leverage points for behavioural changes – PT is neither prescriptive nor interventionist.

Heuristic assemblage – interrelating transition management, practice theory and the capability approach

It might seem to be a heroic undertaking to combine such different approaches. The objective of our effort needs thus to be clarified. What we do not intend, not even think of, is to develop the ground for a theoretically sound overarching approach to change. What we rather have in mind is to present an eclectic assemblage of heuristics, the combination of which can be used to guide prescriptions for governing sustainability transitions which are both normatively assessable and linking the individual to the societal dynamic.

Above we developed the specific strengths of the three approaches: Practice theory is well performing at rendering the bigger picture by highlighting the complexities and entanglements of human activities. The interrelations between skills, material artefacts and meaning can be used to observe macro-societal change (e.g. analysing meta-practices such as food provisioning) as well as on the level of collectives or groups which practice non-mainstreamed activities (e.g. analysing the introduction of “Veggie Thursdays”). These meso-level activities, i.e. meso-level practices which involve collective agency, might be those that transition management approaches are focussing on. A rich body of experiences building on rich descriptions of case studies has emerged on the configuration of what is addressed in TM as being niches, e.g. how collaboration and learning happen, how niches impact on the mainstream. The capability approach, in quite a complementary fashion to practice approaches, offers a very clear conceptualisation of the individual; CA allows to foster our understanding why individuals engage in these activities, and how participation to such collectives can impact on individual wellbeing. By extension, CA can be mobilized to comprehend how such engagement could be strengthened or even made more effective in terms of its impact on individuals' capabilities. In effect, the capability approach offers a normative framework for sustainability-related assessments.

Figure 5 illustrates somewhat a simplification of our heuristic assemblage. Starting from the top, the societal urge for transitions appears because obvious ‘unsustainable’ practices (in blue) prevail and should somehow transform into ‘sustainable’ ones (in green). While PT can be mobilized to analyse the entanglements between skill, material and meaning of both kind of practices, PT does not help us to distinguish between sustainable and unsustainable practices, nor does it really allow us to prescriptively devise – i.e. to steer and govern – a world of blue practices into a world of green ones. It is here that TM comes into play as the body of experiences and experiments with the management and mainstreaming of transition arenas (i.e. niches). Still TM cannot be used to determine the sustainability of niches; it merely purports a promise to enact change. The sustainability assessment of practices on the level of niches and on the level of regimes can be undertaken through CA-based assessments at the individual levels. The latter CA-based level of evaluation also renders a picture of the reasons of such niche-level engagements, and - by extension - how transition governance could facilitate such engagement and make it more effective.

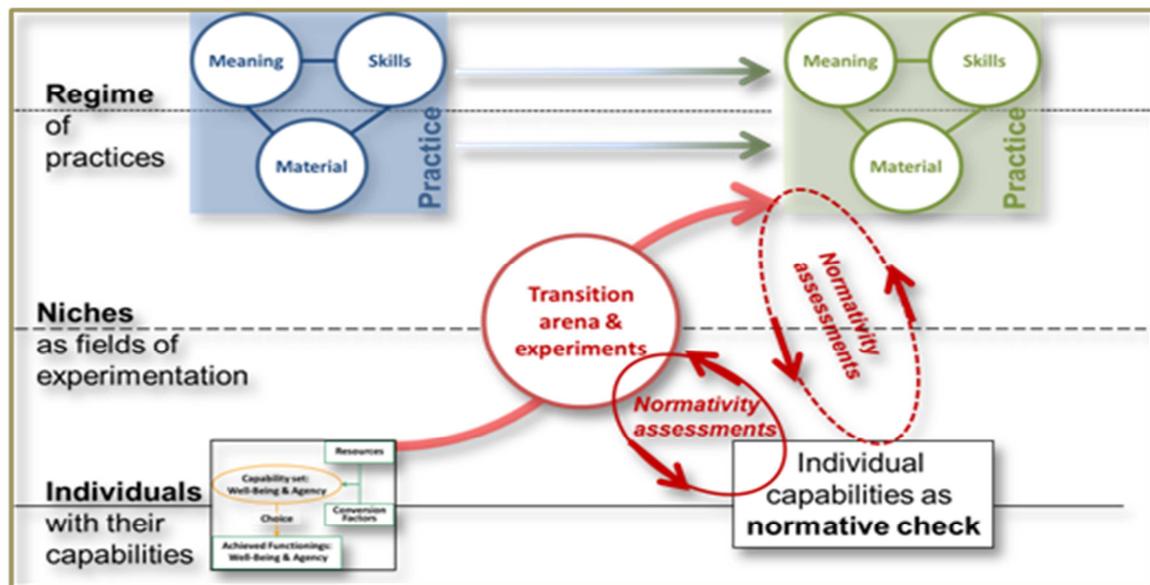


Figure 6: Assembling practice theory, transition management and capability approach for governing sustainability transitions

While much of our intuitive heuristic assemblage remains unexplored, we focus in the following to critically assess whether the interplay between individual and societal (and meso) levels that the assemblage wants to generate might further our understanding of the governance of sustainability transitions. We develop this critique while further developing three specific proposals that are enabled by the heuristic assemblage: (I) As policy advice for sustainability transitions needs a normative foundation, we link transition governance at the meso- and the macro-level back to the individual level. (II) Social learning in those transitions is an interaction between the meso-level (dealt with by TM) and the individual level (CA). (III) Finally, the governance of niche practices is critical for the societal success of transition management and places itself at the intersection of meso- and macro-level, or TM and PT, respectively.

Spelling out three proposals along the heuristic

Sustainability assessment: involving the individual

Sustainability transitions have a normative aim: sustainability. As a consequence, one has to be able to discriminate between sustainability-oriented transitions and other-oriented transitions – or, as this won't be a black and white distinction, between the degree of progress towards sustainability that a transition aims to achieve, is achieving or has achieved (ex ante, ad hoc, or ex post assessment). Independently of the moment of assessment, of whether sustainability is seen as inherently multi-dimensional or has the potential to be aggregated to one single final objective (and hence become measurable with a single index), a normative measuring rod is required to make such an assessment possible. What could be the source of such normativity?

The Brundtland Commission report (WCED 1987) sees the source of normativity in principles of intra- and intergenerational justice, measured at the level of the needs of the world's poor and of future generations. Even though the report has an unclear understanding of needs, it implicitly aims at achieving and guaranteeing the fulfilment of a minimum level of individual needs. The report's normativity originates from a consequentialist worldview (i.e. improving individual quality of life) coupled to a set of systemic conditions (i.e. preservation of ecosystems, appropriate socio-economic systems etc.) which are means to this end. The basic measuring rod for sustainability transitions should therefore be a measurement of life quality (Costanza et al.

2007, Rauschmayer et al. 2011), focussing on the attainment of these minimum thresholds by all and forever.

Against such an understanding of sustainability, it seems appealing to use the capability approach as a basis for assessing the achievement of basic quality of life (de Vries & Petersen 2009). Alkire (2002) analysed several proposals of what people currently consider as relevant dimensions of quality of life (or human development) and she concluded that there was a large overlap between economic, sociological, psychological, and philosophical analyses. Conceptually, it is tempting to extend the scope of this endeavour to future generations (cp. Sen 2013), but this is bound to difficulties, not the least one being that we can say only little about the capabilities of future generations. It is then inevitable to develop models of how individuals depend on ecological and socio-economic systems and of how these will evolve over time (Lessmann and Rauschmayer 2013). Based on these models, one might then develop indicators to measure the probability of achieving these means to the end of a decent human quality of life for future generations. The discussions in the EU “Beyond GDP”-initiative (e.g. European Parliament 2011), the Stiglitz-Sen-Fitoussi commission (Stiglitz et al. 2009), or the recent German Enquete Commission on growth, welfare and quality of life (Enquete Kommission, 2013), have shown different ways how this can be done on a macro-level – even though not necessarily in a theoretically consistent way.

The challenge to develop consistent assessments of sustainability on all levels (individual, niches, regimes) necessarily brings to the fore a more complex mix of process-, output-, and outcome-related criteria – nearly all of them being proxies for the quality of life of future generations and partially also of the world’s poor (cp. Rauschmayer et al. 2009 on process- or outcome evaluation). Evaluation criteria which target the outcomes of transition processes - in parallel to standard outcome-oriented criteria such as decrease in CO₂-emissions – could therefore also include perspectives such as ‘changed psychological settings’, ‘changed material use in practices’, or ‘societal performance of niches’. Some scholars of sustainability research (e.g. Leach et al. 2010) tend to refrain from all kind of outcome-related sustainability assessments and focus on process-related criteria instead. This may be due to an increasingly arbitrary use of the concept of sustainability, but also to the impossibility of predicting future states of quality of life. Process-criteria are merely proxies for the ultimate objective of sustainability – or, they relate to different, non-consequentialist understandings of normativity, such as discourse ethics or libertarian perspectives. How to practically assess niches? Transition management (as well as other parts of sustainability research) emphasises the necessity to make assessments in a participatory way – notably to foster the possibility for learning (see section 4.2 below) and to facilitate the change of meaning of practices (see section 4.3).

However, transition managers tend to be cautious to confront the participants of proto-niches (i.e. the so-called transition arena participants) with a priori normative perspectives, as this might lead to reactance from participants. This caution is related to the tension inherent in the action research design of transition management: on the one hand, the organisers of the management process are just organisers, facilitators, and moderators and should therefore adopt a normatively neutral position. On the other hand, TM has an explicit normative aim and the organisers are obliged – and often motivated – to foster this target (cp. Wittmayer, Schöpke et al 2013). Looking more deeply into the CA, a way to handle this tension might become visible. Along the lines of CA’s differentiation between concerns for one’s own well-being and commitments to others, one may interpret sustainability concerns as concerns for the well-being of others. Then it is possible for the TM facilitators to try to strengthen sustainability concerns not as a limitation to concerns for one’s own well-being, but to empower participants in their freedom to pursue other-related goals. When combining the CA with results of environmental psychology (see e.g. Schöpke and Rauschmayer accepted), transition managers should design interventions that target the normative and consequentialist side of sustainability transitions (i.e. highlight intra- and intergenerational justice as being the meta-objective of the local or sectoral process) as to enhance the agency freedom and agency achievement of the participants.

This could be done through helping the participants to see possibilities how they can contribute to the well-being of the world's poor and of future generations. Niche participants might then become more aware of – or even value higher – the well-being of these distant people.

Intrinsically, we propose to explicitly maintain a normative and content-related character to transition governance. The freedom of participants and non-participants of sustainability transitions can be strengthened by referring to the needs of unborn people or the world's poor in a way that stimulates and enhances that part of human agency that is geared towards the well-being of other people. Many methods targeting this motivational change⁴ rely heavily on aspects of social and individual learning which is the topic of the next subsection.

Social learning for sustainability transitions: empowering individuals, creating alternative niches and changing practices

Social learning is of relevance at three different levels: the individual level, the niche level and the regime level. Briefly stated, at the individual level, social learning can contribute to empowering individuals as well as to raise their awareness and motivation for sustainability-related activities. At the niche level, learning can contribute to the development of alternative ways to solve complex challenges, to innovations and therewith – indirectly and potentially - to the empowerment of niche participants. At the regime level, learning processes are part of adaptation and change processes of practices, and therewith one possible core source of transitions. At the same time learning processes at the different levels are interlinked: e.g. alternatives coming up as results of learning processes in a niche provide a changing context for individual development and learning. And changed societal practices at the regime level in turn provide different contexts for the development of alternative niches.

Within sustainability transitions, innovative niches are meant to play an essential role. In such niches, reflexive governance approaches - like TM – attempt to stimulate innovations notably via processes which focus to foster the social learning of engaged 'frontrunners'. To comprehend changes initiated at the level of these individuals, it might be important to grasp the learning processes facilitated by TM. Among these learning processes, social learning as been described as a source for the emergence of the (radically) new, of empowering niches and individuals and of influencing how sustainability is valued in the transition process. Three very basic questions raised by Bennet and Howlett (1992) help to structure an analysis of social learning: (I) who learns, (II) what is learned and (III) what is learning supposed to contribute to?

(I): Looking at niches, we focus at the individuals that learn. E.g. in a TM process facilitating the development of transition arenas as proto-niches, it is the participants as well as action researchers that learn. But, as said, learning never is a purely individual experience, but happens in a social setting (Del. 4.1, Wittmayer et al. 2011: 19f; Wittmayer 2013 b), linking the individual and the collective level.

(II): Within social learning processes, one can differentiate two⁵ different orders referring to what is learned: first-order learning is based on gaining new knowledge, while underlying assumptions, values and identities remain untouched (Argyris and Schön 1978; 1996). Second-order learning includes changes in fundamental values and assumptions.

(III): The latter learning processes are at the basis of fundamental change and adaptation processes and allow dealing with complexity and uncertainty, e.g. through collaborative action and dialogue (e.g. Schein 1993; Garmendia & Stagl 2010). Second-order learning processes are

⁴ Concretely, this could mean to include moments of deep questioning (Naess 2000, e.g. through why-laddering, [Wittmayer et al. 2011](#)), of dialogues ([Buber 1995](#)), dynamic facilitation and wisdom councils (Rough 2002), systemic constellations ([Sparrer 2007](#)), sociocratic or holacratic facilitation ([Charest 2009](#)) or further forms of process work ([Mindell 1995](#)). In June 2011 one of the authors organised a workshop, funded by the European Science Foundation, where more than 20 researchers applied the named and additional methods to find out whether and how those are suitable for facilitating sustainability transitions ([see Omann, Bohunovsky et al. 2011](#)).

⁵ Other authors differentiate three learning orders (e.g. Hall 1993).

equally and traditionally taken as important in any innovative process as they assure that improvement – or change, or new products – is critically reflected upon on its way towards institutionalisation and generalisation. Furthermore second-order learning is supposed to be one important source for voluntary behavioural change (Wittmayer et al. 2013), which in turn is of core importance in the light of aiming for radical changes towards sustainability transitions.

Looking more into TM as an approach to facilitate niches development, Rotmans and Loorbach (2009: 10) explain that transition experiments have a social learning objective aiming to contribute to sustainability goals in a significant and measurable way. Nevertheless they do not define these objectives in a more explicit way then stating that all sustainability dimensions (economic, ecological and socio-cultural) should get addressed. As outlined above, within TM there is a strong reliance on the participating frontrunners to decide on how to deal with sustainability. This brings up the question, what kind of learning experiences may lead to a contribution to sustainability goals. Here we distinguish two basic directions: (1) participants can discover new or more effective ways of realizing an (already) intended sustainable development and (2) participants can gain insights which make them more aware of sustainability issues and more motivated to address them in the TM process. In the first case social learning as well is contributing to TMs' core aim of empowerment of individuals and niches (Wittmayer et al. 2013, Schöpke & Rauschmayer 2012).

But learning (and empowerment) depends on the participating individuals and is not necessarily connected to sustainability, drawing attention to the second case: social learning in connection to values, worldviews, motivation and awareness related to sustainability. As Schöpke and Rauschmayer (2012) put forth, the learning and empowerment process needs to get connected to a raising awareness and motivation on sustainability issues. The concept of social learning in general describes this change, as it is not just about finding “new facts and a better understanding of relations and impacts but [...] a way to shape our values and reflect on assumptions and limitations behind our knowledge” (Garmendia & Stagl 2010: 1714). But: again not all kinds of learning including value and worldview change can be considered to be connected to sustainability awareness and motivation. Rauschmayer and Omann e.g. highlight the need for deep changes including strengthening the intrinsic sustainability motivation of actors (2012) in opposite to extrinsic motivations (Kasser 2010). Hedlund-de Witt (2013) very recently showed how only certain worldviews are positively related to sustainability motivation and behaviour. This may as well form a basis to further develop facilitation techniques to allow for second-order learning that works towards empowerment and raising sustainability awareness and motivation like.

In the TM methodology there is a focus on providing the conditions for innovations to arise in these learning processes – e.g. via selecting frontrunner for participation or via the envisioning process – to contribute to radical changes. Only very recently TM projects explicitly address the normative orientation of TM towards sustainability as part of the process; and therewith as part of the social learning experience. Wittmayer et al. propose to facilitate a learning journey to render sustainability relevant for the local context in which the TM project takes place (Wittmayer et al. 2013). They refrain from addressing sustainability directly, e.g. by introducing the concept to the TM process, but relate the envisioning and agenda setting to sustainability via stimulating thinking of participants in four dimensions: environmental and social thinking, time horizon (long- and short term) and interregional thinking (Wittmayer et al. 2013).

Finally, the analytical lens of social learning could help to link the individual- and niche-level learning to the dynamics occurring at the level of practices. Social learning processes in niches – which are partially building on and partly generating changes of values, worldviews, awareness and motivation at individual level - can influence practices at the niche level. This would in principle happen in all three constituents of a practice: skills, material artefacts and meaning. In effect, alternative niches involve the emergence of a particular meaning with respect to the practice at hand. This emerging meaning is supported by learning processes in as far as learning can contribute to change values and/ or worldviews. Similarly, the empowerment of individuals

in niches may build on learning at the level of the development of new skills (c.p. Pick and Sirkin 2011). Last but not least, alternative niches may involve learning to use new material artefacts or to use given artefacts differently.

The governance of niches: heaving alternative practices into the mainstream

Empowerment and social learning at the individual levels are fundamental objectives in TM-like activities, and which co-define almost per definition a capability-based assessment of emerging practices. Simultaneously, the dynamics (e.g. of social learning) as well as the very existence and feasibility of TM-experiments is dependent on a series of collective phenomena which exceed the individual levels of participants or their simple agent-based aggregation. The very foundation of TM-experiments is to see niche practices, i.e. agreed doings by individuals in specific groups responding to particular conditions, inspire the (r)evolution of the general, routinized way of doing, i.e. the regime practices. Beyond the question of the individual and his potentially enhanced and enriched capability-set, lies the question of what the impact, inspiration, and interpersonal learning is that could be generated via niche-level practices. The collective nature of such niches needs to be credited. In our own terminology, this question evolves into how alternative niche-level practices contribute to reconfiguring unsustainable practices. In the background of this question, on whether and how 'niche practices' with their collective form of organisation influence 'mainstream practices', stands not merely the concern of gaining insights into such dynamics, but situates the fundamentally prescriptive question of the governance of the niches, i.e. on how to steer niche practices in a way that they contribute to the emergence of renewed sustainable regime practices.

The dynamics of emergence and diffusion of the practices of existing, non-experimental, self-governed alternative collectives, i.e. collective alternatives which exemplify 'organically-grown' niches, paradoxically enough could provide a series of up-front insights into the existence and position of potential governance levers. Investigating the meanings, skills and artefacts at niche-level practices provide for a certain comprehension of the "configurations that work" (Kemp et al. 1998) which a governance approach would need to address. A considerable amount of scholarly work is thus devoted since recent into accumulating such knowledge on the specific level of grassroots innovations (Seyfang & Smith 2007), within general processes and activities of social innovation and in our case directly within TM-experiments (Avelino & Rotmans 2011). While a systematisation and theorisation of this empirical, case study-based knowledge is still to be developed (Seyfang & Smith 2007), a series of 'conditions' or 'factors' start to be agreed upon in literature.

First, the fundamentals of the emergence and diffusion of niche dynamics have been identified to build among others on the importance given within the collective niche practices to the creation of alternative (to pure monetary) value for the local community, e.g. local jobs, fair trade, fair wages, but also pride, recognition, belonging. A second factor which has been identified repeatedly relates to the significance attached by individuals to the collective character of the niche practices, in particular for instance because the collective enables the niches to develop risk-sharing arrangements. Both factors link, if translated into CA terms, to the joint realisation of other-regarding motivations instead of the quest for own well-being (cp. Mock et al. 2013). A third element is the existence of mechanisms within the collectives which enable and protect the capitalisation of personal and inter-personal knowledge and skills, as well as trust. Learning by doing - and in general second-order learning processes - as stimulated through TM, could be essential in this respect. Fourthly, the proactivity and vision-building which the collectives develop with respect to external catalysts - such as the openness of the technological systems their activities are embedded in or the circumventing of the legal and regulatory frameworks - has been identified as another factor. TM back-casting techniques try to integrate this prerogative. Finally, intra-niche and inter-niche deliberation and collaboration as cohesion- and meaning generating dynamics are crucially implied in the diffusion of niche practices.

With a sight on such ‘configurational’ elements of niche emergence and diffusion, practice approaches reveal not only their usefulness as a heuristic to organize case study descriptions. PT has been widely adopted (Cohen et al. 2013) to account for the apparent non-ordered entanglement of elements, i.e. the web of meanings, skills and artefacts, the co-evolution of structural and individual factors which are prevalent in such niches. As with PT in general, the step from descriptive and accumulative work on niche-regime dynamics into analytical and prescriptive developments reveals far from evident. This intrinsic difficulty with applying PT-grounded case study work to the configuration of governance mechanisms is reinforced by the very fact that grassroots and social innovations remain – and be it via their explicit character of being conscious alternatives to the mainstream – in many instances hostile (or at least suspicious) to interventionism by public authorities. Even progressive conceptions of the mechanisms of governmentality (e.g. Le Galès & Lascoumes 2012), which give considerable room to non-linear, multi-actor and indirect streams of influence of governance schemes on social phenomena, appear relatively unprepared to account for the complexity of avoidance, silent acceptance and partnership mechanisms that niche practices deploy with regard to public authorities in general, and with respect to the instrumentarium of institutional governance in particular.

Along the basic epistemological stance taken by TM, betrayed by its roots in innovation theory, which favours open to pre-determined objectives for its transition arena processes, the governance of niche-regime dynamics remains thus a widely open, normatively non-orientable field of action. Free experimentation in combination with the natural spirit of innovation and human ingenuity is not easily compliant with steering of practices towards the – even if loosely – predefined goal of sustainability. The governance of alternative niche practices hence most often remains a call for framework conditions (e.g. room for experimentation) which merely allow to foster more and wider collaborative experiments, more open spaces in peoples’ and collectives’ lives where alternatives to the regime can locally emerge and flourish, while remaining somewhat outside of any possibility to seriously threaten regime-level practices. Successful ‘organically-grown’ niches do profit quite directly from this generic ‘laissez faire’ with some of them surfing very elegantly the ‘grey zones’ left free of any direct governance interventions. Especially in urban environments such sustainability-inspired experimentation zones have however rightfully given raise to criticisms because of the socio-environmental inequities that such niches can carry (Swyngedouw 2010): access to experimentation can at least implicitly be negotiated only by those who have a particularly favourable set of capabilities, values, interpersonal linkages and social capital.

Conclusion

In this paper, we headed to address one of the most pressing policy challenges with respect to sustainability transitions. Scientific activities which are targeted to engage and enact on societal problems - and transition governance itself is one such activity - are necessarily prescriptive endeavours, have to recognize the fundamental normativity of sustainable development, and need to embrace the importance that individuals take in societal change.

We explored in which way a combination of three heuristics, with their respective strengths and weaknesses, might overcome the lack of an overarching theory which would allow providing the background for understanding sustainability transitions.

First, Transition Management has been developed to infer societal transitions, but TM cannot differentiate between sustainability-related outcomes and other outcomes of transitions. It is even one of the fundamental in-builds – and arguably strengths - of TM to leave the space of objectives open for negotiation and agreement to participants. Furthermore, beyond issues related to individual frontrunners and moderational capacity, TM does not have a sufficiently clarified understanding of those individuals who are participating in the transition experiments.

Second, the capability approach covers part of these normative and individual shortcomings; CA has been developed to provide for normative assessments based on individual human development. CA can – with obvious difficulties, but still – be adapted to be usable for sustainability assessments: CA is able to differentiate between self- and other-regarding motivations, the latter being of particular importance in any move towards more inter- and intra-generational justice.

But, CA-based models are static and contain no theory of societal phenomena. Therefore, they cannot really explain societal, dynamic processes such as sustainability transitions. Practice theory, finally, can be mobilized to describe changes at the societal level, indicating how social practices come about and change. At the same time, practice approaches have no normative foundations and have difficulties in determining causal relationships underlying change. Both aspects make it rather challenging to deduce prescriptive policy advice on the basis of PT.

We tried to show how a combination of these three heuristics could generate a heuristic assemblage which can be of use to describe, explain, assess and interrelate changes at the individual, the niche, and the regime level. We sketched how the indispensable sustainability assessment of transitions should be based on the individual, but comprehend also phenomena at collective, levels. Learning processes which constitute a major aim of TM experiments and are fundamentals for enhancing capability-sets of individuals, also show the interrelatedness of individual and niche levels. The CA-based understanding of freedom, in particular the agency-freedom of pursuing other-regarding goals, might show a way out.

The governance of sustainability transitions therefore requires, *inter alia*, to focus on second-order governance, i.e. a governance that does not only concentrate on providing space for niche development and support to niche diffusion, but a governance scheme that can reflexively cope with the learning- and engaging-dynamics at individual levels on which societal sustainability transitions are necessarily relying on. At the same time, governance of sustainability transitions has to be normatively selective, i.e. be able to guide development in and of niches.

Acknowledgments

The present has been developed as part of the InContext-project, funded by the EU under its FP7 programme (THEME ENV. 2010.4.2.3-1: Foresight to enhance behavioural and societal changes enabling the transition towards sustainable paths in Europe) (Grant Agreement number: 265191). For more information on the project: <http://www.incontext-fp7.eu/>

References

- Alkire, S., 2002. Dimensions of Human Development. *World Development* 30, 181-205.
- Alkire, S., 2006. Public Debate and Value Construction in Sen's Approach, in: Kaufman, A. (Ed.), *Capabilities Equality. Basic Issues and Problems*. Routledge, New York, 133-154.
- Avelino F., Bressers N., Kemp R, 2012, "Transition Management and Sustainable Mobility Policy: the Case of the Netherlands", in Geerlings, H., Shiftan, Y., Stead, D. (Eds) *Transition towards Sustainable Mobility: the Role of Instruments, Individuals and Institutions*, Hampshire: Ashgate, 33-52.
- Avelino, F., 2011, *Power in Transition. Empowering Discourses on Sustainability Transitions*. Erasmus Universiteit Rotterdam.
- Avelino, F., Rotmans, J., 2011, A dynamic conceptualization of power for sustainability research. *Journal of Cleaner Production*, 19(8):796-804
- Ballet, J., Bazin, D., Dubois, J.-L., Mahieu, F.-R., 2011. A Note on Sustainability Economics and the Capability Approach. *Ecological Economics* 70, 1831-1834, doi: 10.1016/j.ecolecon.2011.05.009.
- Ballet, J., Koffi, J.-M., Pelenc, J., 2013. Environment, justice and the capability approach. *Ecological Economics* 85, 28-34, doi: <http://dx.doi.org/10.1016/j.ecolecon.2012.10.010>.

- Bell, D.E., Raiffa, H., Tversky, A., 1988, Descriptive, normative and prescriptive interactions in decision making, in: Bell, D.E., Raiffa, H., Tversky, A. (Eds.), *Decision making: descriptive, normative and prescriptive interactions*. University Press, Cambridge, 9-30.
- Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., Rickne, A., 2008, Analyzing the functional dynamics of technological innovation systems: a scheme of analysis. *Res Policy* 37:407–429.
- Buber, M., 1995, *Ich und Du*. Reclam, Stuttgart.
- Charest, G., 2009, *Vivere in sociocrazia! Un modo di governare che riconcilia potere & cooperazione*. Esserci.
- Cohen, M.J., Brown H.S., Vergragt, P., (Eds) 2013, *Innovations in sustainable consumption: new economics, socio-technical transitions and social practices*. Edward Elgar.
- Costanza, R., Fisher, B., Ali, S., Beer, C., Bond, L., Boumans, R., Danigelis, N.L., Dickinson, J., Elliott, C., Farley, J., Gayer, D.E., Glenn, L.M., Hudspeth, T., Mahoney, D., McCahill, L., McIntosh, B., Reed, B., Rizvi, S.A.T., Rizzo, D.M., Simpatico, T., Snapp, R., 2007, Quality of life: An approach integrating opportunities, human needs, and subjective well-being. *Ecological Economics* 61, 267-276, doi: doi:10.1016/j.ecolecon.2006.02.023.
- de Vries, B.J.M., Petersen, A.C., 2009, Conceptualizing sustainable development - An assessment methodology connecting values, knowledge, worldviews and scenarios. *Ecological Economics*, 1006-1019, doi: doi:10.1016/j.ecolecon.2008.11.015.
- Drèze, J., Sen, A., 2002, *India: Development and Participation*. Oxford University Press, Oxford.
- Duineveld, M., Beunen, R., Ark, R., Assche, K., During, R., 2007, *The difference between knowing and walking the path: een essay over het terugkerend maakbaarheidsdenken in beleidsonderzoek*, Wageningen: Wageningen University and Research Centre.
- Enquete-Kommission, 2013, *Schlussbericht der Enquete-Kommission „Wachstum, Wohlstand, Lebensqualität – Wege zu nachhaltigem Wirtschaften und gesellschaftlichem Fortschritt in der Sozialen Marktwirtschaft“*, in: Bundestag, D. (Ed.), Berlin, p. 844, <http://www.bundestag.de/bundestag/gremien/enquete/wachstum/Schlussbericht/17-13300.pdf>, accessed 08.08.2013.
- Eshuis, J., Spekking, W., Loorbach, D., Roorda, C., Stuiver, M., Van Steenbergen, F., 2012, *Challenges and Tensions in Area Based Transitions*, paper presented at the 7th International Conference in Interpretive Policy Analysis, Tilburg, the Netherlands, 5-7 July.
- European Parliament, 2011. *European Parliament resolution of 8 June 2011 on GDP and beyond – Measuring progress in a changing world (2010/2088(INI))*, p. 4, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P7-TA-2011-0264+0+DOC+PDF+V0//EN>, accessed 08.08.2013.
- Frantzeskaki, F., De Haan, H., 2009, Transitions: Two Steps from theory to Policy. *Futures*, 41: 593-606.
- Frantzeskaki, N., Loorbach, D., Meadowcroft, J., 2012, Governing Societal Transitions to Sustainability, *International Journal of Sustainable Development* 15(1-2): 19-36.
- Garmendia, E., Stagl, S., 2010, Public Participation for Sustainability and Social Learning: concepts and lessons from three case studies in Europe, *Ecological Economics* (69): 1712-1222.
- Geels, F., Schot, J., 2007, Typology of sociotechnical transition pathways. *Research Policy* 36: 399–417.
- Geels, F.W., 2010, Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy* 39, 495–510.
- Giddens, A., 1984, *The Constitution of Society. Outline of the Theory of Structuration*. Cambridge.
- Giulio, A. D., B. Brohmann, et al., 2012, 'Needs and Consumption - a Conceptual System and its Meaning in the Context of Sustainability' in R. Defila, A. D. Giulio and R. Kaufmann-Hayoz (Eds.) *The nature of sustainable consumption and how to achieve it*. München: oekom: 45-66.
- Gutwald, R., Leßmann, O., Rauschmayer, F., Masson, T., 2011. *The Capability Approach to intergenerational justice - a survey*. Leipzig, Helmholtz-Centre for Environmental

- Research UFZ, UFZ Discussion Papers, 8/2011 - GeNECA 4, <http://www.ufz.de/index.php?de=14487>.
- Hendriks, C., 2007, Making democratic sense of socio - technical transitions for sustainability. Paper presented at the Politics and Governance in Sustainable Socio - Technical Transitions, Blankensee, Germany.
- Ibrahim, S.S., 2006, From Individual to Collective Capabilities: The Capability Approach as a Conceptual Framework for Self-help. *Journal of Human Development* 7, 397-416, doi: <http://dx.doi.org/10.1080/14649880600815982>.
- Ingebrigtsen, S., Jakobsen, O., 2009. Moral development of the economic actor. *Ecological Economics* 68, 2777-2784, doi: 10.1016/j.ecolecon.2009.04.002.
- Jhagrooe, S., 2012, Tussen transitie management en ideologie. Een aanzet tot transitiepolitiek 2.0. 26 maart 2012. DRIFT. Downloadable via <http://www.drift.eur.nl/?p=262>.
- Jhagrooe, S., Frantzeskaki, N., 2012, A State of Exceptional Democracy: Unravelling the politics of crisis in Dutch infrastructure governance. Paper presented at the 7th International Conference on Interpretive Policy Analysis Understanding the Drama of Democracy: Policy Work, Power and Transformation, July 5-7, 2012, Tilburg, The Netherlands.
- Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., Mccarthy, J. J., et al., 2001, Sustainability Science. *Science*, 292(5517), 641-642.
- Kemp, R., Loorbach, D., Rotmans, J., 2007, Transition management as a model for managing processes of co-evolution towards sustainable development. *Int J Sustain Dev World Ecol* 14(1):78-91
- Kemp, R., Schot, J., Hoogma, R., 1998, Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management. *Technology Analysis and Strategic Management*, 10(2): 175-196.
- Le Galès, P., Lascoumes, P., 2012, *Sociologie de l'action publique*. Armand Colin.
- Leach, M., Scoones, I., Stirling, A., 2010, *Dynamic Sustainabilities - Technology, Environment, Social Justice*. Earthscan, London.
- Leßmann, O., 2012, Challenges in Applying the Capability Approach Empirically: An Overview of Existing Studies. Leipzig, Helmholtz-Centre for Environmental Research UFZ, UFZ Discussion Papers, GeNECA 1a, http://www.ufz.de/export/data/408/39068_DP1a_2012_Lessmann_empirical_studies.pdf, accessed 10.09.2012.
- Lessmann, O., Rauschmayer, F., 2013. Re-conceptualising Sustainable Development on the basis of the Capability Approach: a model and its difficulties. *Journal of Human Development and Capabilities* 14, 95-114, doi: 10.1080/19452829.2012.747487.
- Loorbach, D., Rotmans, J., 2010, The practice of transition management: Examples and lessons from four distinct cases. *Futures* doi:10.1016/j.futures.2009.11.009
- Loorbach, D., 2010, Transition Management for Sustainable Development: a perspective, complexity based governance network, *Governance*, 23 (1): 161-183.
- Loorbach, D., 2007, *Transition Management. New Mode of Governance for Sustainable Development*. Utrecht: International Books.
- Loorbach, D., Frantzeskaki, N., Thissen, W., 2011, A Transition Research Perspective on Governance for Sustainability, in Jaeger, C., Tàbara, J., Jaeger, J. (eds) *European Research on Sustainable Development: Vol.1: Transformative Science Approaches for Sustainability*, 73-89.
- Markard, J., Raven, R., Truffer, B., 2012, Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6), 955-967.
- Meadowcroft, J., 2007, Environmental Political Economy, Technological Transitions and the State. Paper presented at the Politics and governance in socio-technical transitions, Blankensee, Germany.
- Mindell, A., 1995, *Sitting in the Fire: Large Group Transformation using Conflict and Diversity*. Lao Tse Press, Portland, OR.

- Mock, M., Omann, I., Rauschmayer, F., 2013, Do community currencies enhance sustainable quality of life? Presentation given at the ESEE - European Society for Ecological Economics, Lille.
- Næss, A., 2000, Deep Ecology and Education: A Conversation with Arne Næss. *Canadian Journal of Environmental Education* 5, 48-62.
- Nussbaum, M.C., 2000, *Women and human development: The capabilities approach*. Cambridge University Press, Cambridge.
- Nussbaum, M.C., 2011, *Creating capabilities: The human development approach*. Belknap Press.
- Omann, I., Bohunovsky, L., Rauschmayer, F., 2011, *Below The Waterline. How To Integrate Needs, Values, Emotions Into Societal Processes Towards Sustainable Development.*, ESF - European Science Foundation, ESF Exploratory Workshop Report, http://www.esf.org/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/be_user/ew_docs/10-192_Report.pdf&t=1332846696&hash=e6fd5784211afbede0961d504ea620b5c244b1bd, accessed 26.03.2012.
- Polishchuk, Y., Rauschmayer, F., 2012, Beyond "benefits"? Looking at ecosystem services through the capability approach. *Ecological Economics* 81, 103-111, doi: 10.1016/j.ecolecon.2012.06.010.
- Rauschmayer, F., Lessmann, O., 2013, Editorial: The Capability Approach and Sustainability. *Journal of Human Development and Capabilities* 14, 1-5, doi: 10.1080/19452829.2012.751744.
- Rauschmayer, F., Omann, I., 2012. Transition to Sustainability: Not Only Big, But Deep. *GAIA* 21, 266-268.
- Rauschmayer, F., Omann, I., Frühmann, J., 2011, Needs, capabilities, and quality of life. Re-focusing Sustainable Development, in: Rauschmayer, F., Omann, I., Frühmann, J. (Eds.), *Sustainable Development: Capabilities, Needs, and Well-Being*. Routledge, London, pp. 1-24.
- Ravetz, J., 1999, What is post-normal science. *Futures*, 31(7), 647-653.
- Rip, A., Kemp, R., 1998, Technological change. In: Rayner, S., Malone, E.L. (Eds.), *Human Choice and Climate Change*, vol. 2. Battelle Press, Columbus, OH, pp. 327-399.
- Robeyns, I., 2005, The Capability Approach: a theoretical survey. *Journal of Human Development* 6, 93-117, doi: 10.1080/146498805200034266.
- Roorda, C., Frantzeskaki, N., Loorbach, D., Steenbergen, F. V., Wittmayer, J., 2012, "Transition Management in Urban Context - guidance manual, collaborative evaluation version", Rotterdam: Drift, Erasmus University Rotterdam
- Røpke, I., 2009, Theories of practice – New inspiration for ecological economic studies on consumption. *Ecological Economics* 68, 2490-2497, doi: 10.1016/j.ecolecon.2009.05.015.
- Rotmans, J., Loorbach, D., 2010, Towards a better understanding of transitions and their governance. A systemic and reflexive approach. In: Grin, J., Rotmans, J., Schot, J. (Hrsg) *Transitions to sustainable development – new directions in the study of long term transformation change*. Routledge, New York, 105-220.
- Rotmans, J., Loorbach, D., 2009, Complexity and Transition Management. *Journal of Industrial Ecology*, 13(2), 184-196.
- Rotmans, J., Kemp, R. van Asselt, M., 2001, More evolution than revolution: transition management in public policy. *Foresight* 3 (1).
- Rough, J., 2002, *Society's Breakthrough!: Releasing Essential Wisdom and Virtue in All the People*. AuthorHouse, Bloomington.
- Schäpke, N., Rauschmayer, F., accepted. Addressing Sufficiency – Including altruistic motives in behavioural models for sustainability transitions. *Sustainability: Science, Practice, & Policy*.
- Schein, E., 1993, On dialogue, culture, and organizational learning, *Organizational Dynamics* 22: 40-51.

- Schneidewind, U., Scheck, H., 2012, Zur Transformation des Energiesektors ein Blick aus der Perspektive der Transition-Forschung. In: Servatius, H.-G., Schneidewind, U., Rohlfing, D. (Eds): *Smart Energy - Wandel zu einem nachhaltigen Energiesystem*. Springer, Berlin.
- Sen, A.K., 1985, *Commodities and Capabilities*. Elsevier, Amsterdam.
- Sen, A.K., 1987, *On Ethics and Economics*. Blackwell, Oxford.
- Sen, A.K., 2009, *The idea of justice*. Penguin, New York.
- Sen, A.K., 2013, The Ends and Means of Sustainability. *Journal of Human Development and Capabilities* 14.
- Seyfang, G., Smith, A., 2007, Grassroots innovations for sustainable development: Towards a new research and policy agenda. *Environmental Politics*, 16(4): 584-603.
- Shove, E., 2003, *Comfort, Cleanliness and Convenience: the social organization of normality*. Berg.
- Shove, E., Pantzar, M., Watson, M., 2012, *The dynamics of social practice. Everyday life and how it changes*. Sage Publications.
- Shove, E., Walker, G., 2008, Transition Management and the Politics of Shape Shifting, *Environment and Planning A*, 40, 1012 – 1014.
- Shove, E., Walker, G., 2007, CAUTION! Transitions ahead: politics, practice, and sustainable transition management. *Environment and Planning A* 39, 763-770, doi: 10.1068/a39310.
- Smith, A., Kern, F. (2009): The transitions storyline in Dutch environmental policy. *Environmental Politics* 18(1):78-99.
- Smith, A., Sterling, A., 2008, *Social-Ecological Resilience and Socio-technical Transitions: critical issues for sustainability governance*, STEPS Working Paper 8, Brighton: STEPS Centre.
- Sparrer, I., 2007. *Miracle, Solution and System - Solution-focused systemic structural constellations for therapy and organisational change*. SolutionsBooks, Cheltenham.
- Stiglitz, J.E., Sen, A., Fitoussi, J.-P., Agarwal, B., Arrow, K.J., Atkinson, A.B., Bourguignon, F., Cotis, J.-P., Deaton, A.S., Dervis, K., Fleurbaey, M., Folbre, N., Gadrey, J., Giovannini, E., Guesnerie, R., Heckman, J.J., Heal, G., Henry, C., Kahneman, D., Krueger, A.B., Oswald, A.J., Putnam, R.D., Stern, N., Sunstein, C., Weil, P., 2009. Report by the Commission on the Measurement of Economic Performance and Social Progress. Paris, Commission on the Measurement of Economic Performance and Social Progress, 292, <http://www.stiglitz-sen-fitoussi.fr>, accessed 20.9.09.
- Swyngedouw, E., 2010, *Les Contradictions de la Ville Post-Politique – A la Recherche d’une Politique Démocratique de Production Environnementale*. In: Béal, V., Gauthier, M. & Pinson, G., (eds), *Le Développement Durable Changera-t-il la Ville? Le Regard des Sciences Sociales*, France: Presses Universitaire de Saint-Etienne.
- Vérbong, G., Loorbach, D., 2012, "Governing the Energy Transition; Reality, Illusion or Necessity?", New York: Routledge
- WBGU - German Advisory Council on Global Change, 2011, *World in Transition - A Social Contract for Sustainability*. WBGU, Berlin.
- WCED, 1987. *Our Common Future*, report by the United Nations World Commission on Environment and Development, <http://www.un-documents.net/wced-ocf.htm> [03.04.2010], <http://www.un-documents.net/wced-ocf.htm>.
- Wittmayer, J., 2013, *InContext – Individuals in Context. Supportive Environments for Sustainable Living*. Workshop University of Freiburg, Master of Environmental Governance. Presentation, April 24th, 2013.
- Wittmayer, J., Schöpke, N., 2013, *Action, Research and Participation: the Role of the Researcher in Sustainability Transitions*. Paper presented at the 8th International Interpretive Policy Analysis Conference (IPA) (2013): *Societies in Conflict: Experts, Publics and Democracy*. 3-5 July 2013, Vienna.
- Wittmayer, J., Schöpke, N., Feiner, G., Piotrowski, R., Steenbergen, F. v., Baasch, S., 2013, *Action Research for Sustainability Reflections on transition management in practice*[^]. Berlin, http://www.incontext-fp7.eu/sites/default/files/InContext-ResearchBrief-Action_research_for_sustainability.pdf, accessed 21.09.2013.

Wittmayer, J., Steenbergen, F.v., Quist, J., Loorbach, D., Hoogland, C., 2011, The Community Arena: A co-creation tool for sustainable behaviour by local communities. Berlin, http://incontext-fp7.eu/sites/default/files/Methodological%20guidelines_final.pdf, accessed 15.05.2013.