I Plenary Sessions

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**Vision &
pathway
methodologies
for sustainable
lifestyles**

BIG 2050 – Because living sustainably today is possible!

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Abstract

In what ways could the transition to future sustainable lifestyles be started, communicated, understood and activated in different realities worldwide?

This is one of the many questions that the "Budding Ideas Glocally for 2050" (BIG2050) project aims to answer. Comprising a collection of over 150 promising practices (activities that enable living more sustainably) and addressing different impacts on/of lifestyles worldwide, the project seeks to identify critical environmental and social impacts associated with current consumer trends, consumption patterns and lifestyles, and encourage the transition to a resource efficient future by communicating and fostering innovation for more sustainable ways of living. It also brings together stakeholders to personally analyze their countries' current reality, co-create a vision of how they would like lifestyles in their countries to be like by 2050 and what are they doing / could do to help them to get there. The countries where the project is taking place are: China, Colombia, Ghana, Germany and the Philippines.

During the "workstudios", the multi-stakeholder events organized for the project, the participants apply backcasting as an experiential planning process through immersive tools that comprise the development and understanding of consumers of the future (personas), the creation of scenarios addressing 12 impacts on/of lifestyles that are directly linked to the Millennium Development Goals (education and skilling, employment and work conditions, nutrition, health, mobility, housing, energy generation, urban/rural development, governance, leisure and culture, use of resources and communication), and roundtable discussions to identify current activities, needs and offers, to support bridging the gap between the desired 2050 and today.

This paper aims to present the process and the preliminary insights of the project, after four workstudios (China: *From a low carbon living in 2050 to today*; Colombia: *Collaboration for sustainable lifestyles through innovation*; Philippines: *Innovation for competitiveness towards sustainable lifestyles*; and Ghana: *Collaboration and sustainability: a multi-sectoral path for growth*). The last workstudio will take place in Germany in November 2013. BIG2050 will conclude in early 2014, providing a comprehensive research on the current reality of the project's countries, the development of conditions for sustainable living, an overview of the needs and offers that stakeholders in each country present, an action roadmap per country and recommendations to international donor organizations, businesses, policy makers, civil society, academia and media organizations to address the opportunities each country offers. The scenarios created reflect the aspirations of a majority of middle-income consumers in each of these countries and helps to create action roadmaps that participants commit to bring into reality, to identify the areas that citizens consider the most relevant to be addressed today and to assess the type of partnerships needed to support actions towards change.

Created as a partnership between the German Ministry for Economic Cooperation and

Development (BMZ) and the Collaborating Centre on Sustainable Consumption and Production (CSCP), BIG2050 applies some of the learnings from the EU-funded project SPREAD Sustainable Lifestyles, as it explores socio-environmental impacts, consumer trends and aspirations, and future visions of more sustainable lifestyles through backcasting in a smaller, local scale.

1. Introduction

"If we don't change our direction we are likely to end up where we are headed." Supposedly a Chinese proverb, this saying summarizes very wisely the critical decision that challenges modern societies today.

We are currently guided by the dominant vision of modernity[1], which is deeply entrenched in our society and whose main premise states that continuous economic growth is necessary and desirable. Such premise is one of the main drivers of increasing consumption levels (Mont et al. 2010: 13). The vision and its premises are strongly supported by established actors, rules and institutions in defence of existing economic interests.[2] Current behaviour, actions and policy decisions symbiotically interact with the dominant vision of success equals consumption, delineating a relationship of mutual dependence and reassurance that approaches a sacred nature, leaving little room for questioning.[3]

And yet, the ascendance of such dominant vision still goes largely unnoticed, which brings about serious concerns, for two main reasons. First, there is mounting evidence of negative environmental, social and even economic impacts that derive from the present development model (Millennium Ecosystem Assessment 2005a, BMU et al. 2008, Worldwatch Institute 2010, Schor 2004, Bauman 2008, just to mention a few studies among a vast literature on the subject), which suggests that the dominant vision is short-sighted, unsustainable and far from desirable. Second, it is only by means of a critically rethinking the dominant vision (which requires awareness in turn) that we will be able to change the course of development (Grin et al. 2000: 1) and build a new pathway towards sustainability.

Lifestyles constitute a key aspect of this transition to sustainable development, as they comprise a multitude of everyday activities deeply rooted in consumption and production patterns and are intricately interwoven with people's irrational choices and practices (SPREAD Sustainable Lifestyles 2050 2011: 9). Fortunately, innovative activities that enable living more sustainably are emerging across different cultures, and they can play a fundamental role in the process of building a new vision of success based on sustainable lifestyles and paving the way towards such vision.

But what do sustainable lifestyles look like? In what ways could the transition to future societies that support sustainable lifestyles be activated, communicated, and understood in different cultures, geographies and contexts worldwide? The *Budding Ideas Glocally for 2050* ("BIG2050") project was developed in order to address these questions.

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[1] Bauman (2008: 28) describes the characteristics of modernity: "The society which enters the twenty-first century is no less 'modern' than the society which entered the twentieth [...]. What makes it as modern as it was a century or so ago is what sets modernity apart from all other historical forms of human cohabitation: the compulsive and obsessive, continuous, unstoppable, forever incomplete *modernization*; the overwhelming and ineradicable, unquenchable thirst for creative destruction (or of destructive creativity, as the case might be: of 'clearing the site' in the name of a 'new and improved' design; of 'dismantling', 'cutting out', 'phasing out', 'merging' or 'downsizing', all for the sake of a greater capacity for doing more of the same in the future – enhancing productivity or competitiveness)."

[2] When discussing the phenomenon of "competing visions", Quist (2007: 68) characterizes the regular dominant vision as the one "supported by vested interests and established actors".

[3] Boada-Ortíz et al. (2010: 38), while addressing the culture of consumerism, assert that the simple exercise of considering to reduce consumption sounds like a "heresy" and usually causes "repulse" in our peers.

Using backcasting as its overall methodology, BIG2050 supports the process of critically re-thinking individual and social aspirations by means of co-creating visions of sustainable lifestyles and identifying solutions, current and potential ones, to make these visions come true.

This paper aims to present the process and the preliminary insights from the project.

2. Rationale of BIG2050

The project, funded the German Ministry for Economic Cooperation and Development (BMZ), is managed by the Collaborating Centre on Sustainable Consumption and Production (CSCP) and it was launched at the Rio+20 Conference in June, 2012.

With the core objectives of exploring lifestyles' impacts and aspirations and to develop a set of strategic conditions for living sustainably in the future, starting today, the project combines research-based activities and multi-stakeholder workshops called "workstudios". The process entails assessment of current consumption trends and patterns as well as the environmental and social impacts on/of lifestyles; co-creation of local sustainable scenarios for 2050 addressing such impacts; analysis of possible pathways and drivers of change to reach these scenarios; sharing existing promising practices and alternative consumption niches; and facilitating discussions among stakeholders to identify current actions, opportunities and challenges, as well as their needs and offers to support bridging the gap between the desired 2050 and today.

The following subsections will dive with detail into the project's theoretical background, overall methodology, and expected outcomes.

2.1. Theoretical background: satisfying needs and aspirations sustainably

Since the very first attempts of defining sustainable development, the concept of "needs" is considered to play a key role in the process. The well-known definition expressed in *Our common future* (WCED 1987: 41) is no exception, as follows: "Sustainable development is development that meets the needs of present without compromising the ability of future generations to meet their own needs."[4] The question is: how to approach the concept of "needs" in a way to have its mandate fulfilled, which is, to enable quality of life in harmony with the environment and with others in the long term?

Under the imperatives of modernity, the concept of "needs" has been undergoing a process of increasing fluidity, comprising more and more supposed new needs that clearly forges a logic of "increased survival", aimed at enabling economic growth through increasing consumption and production levels of goods and services (Grupo Marcuse 2009: 73). There are many shortcomings in such logic, and Max-Neef elucidates the two prevalent ones: (i) it overlooks "the fundamental difference between *needs* and *satisfiers* of those needs" (1991: 16), as the former are finite and nearly constant, only being subject to changes, over time and across different cultures, how these needs are satisfied (1991: 18); (ii) it also neglects the fact that satisfiers comprise a large spectrum of possibilities of which economic goods are merely one of them, and may even be dispensable depending on the type of need and how it is being fulfilled (1991: 30-31).

As a consequence of this approach, needs are currently shaped in a way to support the dominant model of production and consumption of goods. In other words, the consumer culture has made the consumption of goods an end in itself, with no real connection to the satisfaction of needs (Harsch 1999: 556-557, Max-Neef 1991: 25). People's behavior, choices and everyday activities

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[4] The document itself, after providing this definition, expressly states the relevance of needs as one of the two "key concepts" within the concept of sustainable development, as follows: "It [the concept of sustainable development] contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

are encouraged to be directed mainly towards fulfilling needs through material possession, when actually most of these needs either cannot be fulfilled through material goods or don't even exist. Needs are kept unfulfilled[5], while major environmental problems abound.[6] This subverts the whole idea of sustainable development highlighted above, since the concept of "needs", once seen as a key factor for enabling sustainable ways of living, has been turned into the touchstone of clearly unsustainable lifestyles.

Nevertheless, BIG2050 has chosen to explore the notion of differing human needs through the consideration of new visions of success based on sustainable lifestyles. To accomplish this aim, the project developed an alternative conceptual framework for human needs relying on Max-Neef's Human Development Scale theory (1991) as its main starting point. The framework is presented in the following paragraphs.

To start with, human needs are understood as the "innate requirements that need to be satisfied in order for people to remain physically, mentally and socially healthy" (Robèrt et al. 2010: 108), going, then, far beyond mere survival (Max-Neef 1991 : 23). These human needs (such as participation, creativity and freedom) are translated into aspirations that work as a compass to individual lifestyle choices.

Needs and aspirations cannot be singly analyzed, as they are all interrelated and interactive (Max-Neef 1991: 17), neither be dissociated from the context in which they are fulfilled, especially from the ecological attributes of such context, due to the fact that humanity pertains to the natural world (Ost 1998: 30-31)[7] and, therefore, such world exerts great influence over human well-being (Millennium Ecosystem Assessment 2005b: 451, Bina 2011: 171). Realizing such dynamic nature of aspirations and human needs – systematically interacting among them, with others and with the environment – helps in really attaining the concept's ability to support the process of building a vision for sustainable living.

There is a fundamental difference between needs and satisfiers, the latter being the ways and means people attempt to fulfill their needs, which can vary over time, from person to person, and through cultures. Human needs and aspirations, on the other hand, are finite and nearly constant, being the same across different historical periods and cultures.[8]

Max-Neef (1991: 32-33) proposed nine categories of human needs and four dimensions of satisfiers which are essential to all people and intrinsically interrelated. These need categories are distinct and yet complementary; the satisfier dimensions cluster individual or collective forms of fulfilling one or more human needs. It's represented below:

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[5] As the preliminary findings of BIG2050 regarding impact assessment on/of lifestyles show, among other patterns, that unemployment rate has not improved or even increased during the last decade across the countries analyzed so far, despite of the considerable economic growth that these countries have experienced over the same time frame. Work, in turn, is a very relevant satisfier of different human needs, especially of the very basic need of subsistence.

[6] The preliminary findings (check footnote 5) also show that increasing resource and energy use is a common pattern across the countries assessed so far.

[7] Ost (1998) interestingly travels back in time to demonstrate the differences between the primitive and the modern men in relation to their attitudes towards nature. It's during modernity that man decides to break up with nature.

[8] We agree with Max-Neef (1991: 27) when he ponders that the lack of empirical evidence, and so, of absolute certainty regarding the perennial nature of human needs should not prevent us from considering their socio-universal character as well as their patterns that have accompanied humans throughout history.
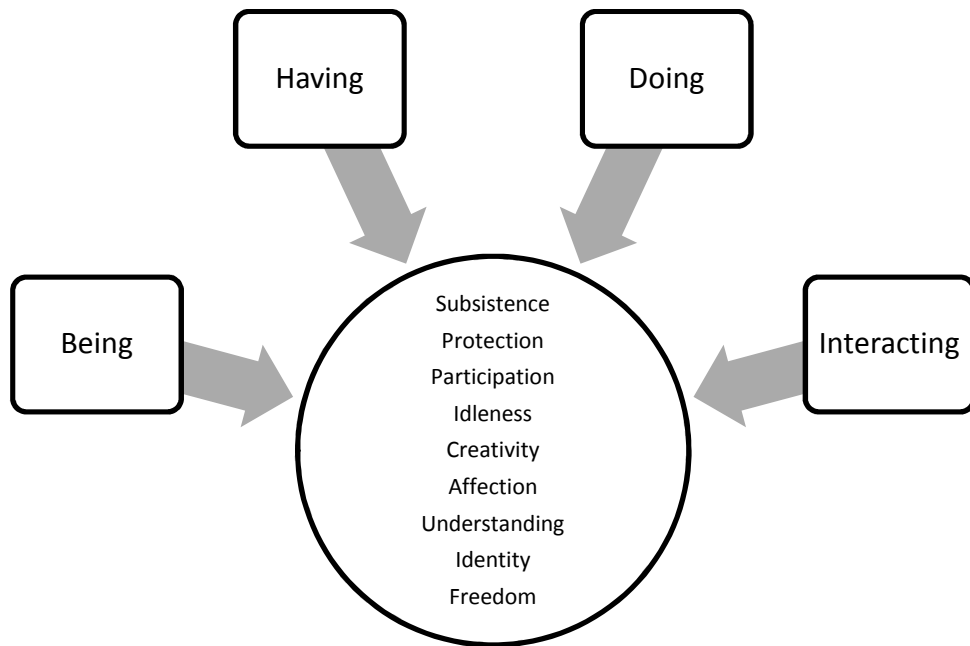
Figure 1: Matrix of human needs and satisfiers

The four dimensions of satisfiers are understood as follows: *Being* relates to personal or collective human qualities and attributes; *Having* relates to institutions, norms, mechanisms, laws and tools (not restricted to a material sense); *Doing* relates to individual or collective actions; and *Interacting* relates to settings where people live and make decisions.

Adding to this picture, BIG2050 selected twelve main lifestyle areas to which satisfiers and their impacts are related. Such areas are: education and skilling, employment and work conditions, nutrition, health, mobility, housing, energy generation, urban/rural development, governance, leisure and culture, use of resources and communication.

Under this perspective, we are able to affirm that it's actually need-oriented satisfiers, in all its diversity and dimensions – and not the chase for economic goods in favor of infinite "pseudo-needs" and unsuitable to meet most real needs – that should constitute the core building blocks of lifestyles, shaping people's behavior, choices and practices towards the world. Economic goods, in turn, are not devoid from relevance, quite the contrary: they are capable of affecting the efficiency of satisfiers, for the good or the bad. It's important, then, that the satisfying mechanisms established by society take the lead in defining the goods that are relevant for fulfilling human needs, and not the other way around.

At this point, we are able to draw two main conclusions. First: to reach sustainable lifestyles, it's necessary to set conditions for satisfiers to be sustainable. Such conditions should be related to each lifestyle area, in order to potentiate satisfiers' fulfillment mandate while setting limits to their impacts.

These are the so-called strategic conditions for living sustainably. Second: a wide range of opportunities unfolds before countries, cultures, businesses and organizations for developing creative and diverse solutions to fulfill human needs and, therefore, to shape sustainable lifestyles.

For this reason, BIG2050 conceives sustainable living as a *glocally* process, meaning a dialectic two-way road: on the one hand, global concepts, opportunities and cooperation forces are tailored into the different local realities and aspirations, with creativity and respect for diversity; on the other, local practices, learnings and models are shared and incorporated globally, in different levels of action, improving global opportunities and fostering a continuous learning process towards sustainable living.

The figure below summarizes the main stepping stones of BIG's conceptual framework for human needs. To reach its core objective, which is, to develop and support the fulfillment of the strategic conditions for living sustainably, altogether taken as the project's desirable vision for sustainable living in 2050 and beyond, BIG2050 relied on backcasting as its overall methodology, as discussed in the next subsection.
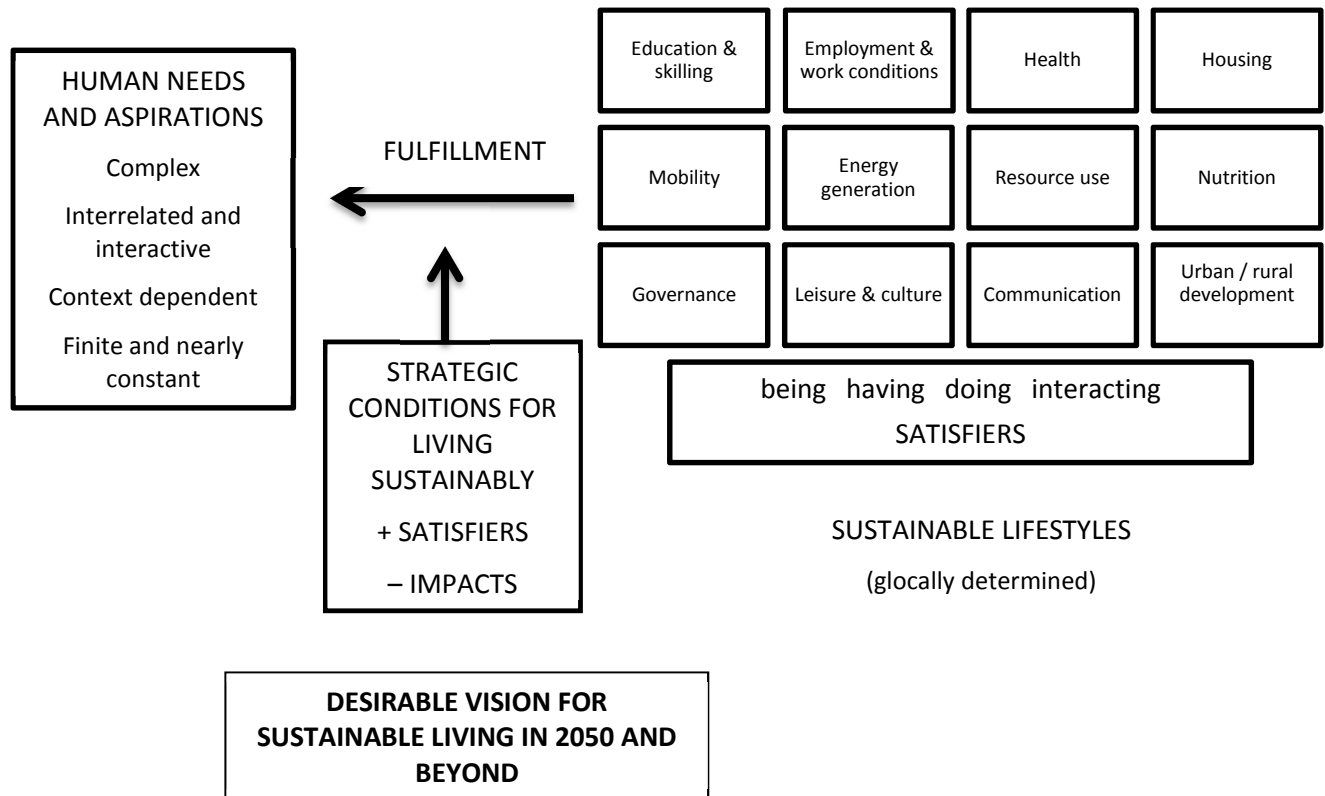

Figure 2: Conceptual framework for human needs

2.2. Backcasting: the overall methodology of BIG2050

Literally understood as "looking back from the future" (Quist 2007: 11), backcasting is about envisioning a desirable future first, a vision able to provide guidance and orientation for defining, in a second moment, which steps are needed to bring about that future (Quist 2007, 2011). Its normative nature stands out as one of the most fascinating features of backcasting, in a sense of focusing on the development of and adherence to normative goals that are to be attained in the future by means of actions designed and taken today with this very purpose (Dreborg 1996: 814, Quist 2007: 11).

Amidst existing obstacles to real change towards sustainable living, starting with our own limited perceptions of what is possible and reasonable (Dreborg 1996: 816), backcasting stands, thus, as a fundamental approach to allow a process of critically rethinking the dominant vision and using creativity to reach beyond existing mindsets and paradigms to build and realize a new (desirable) vision (Quist 2007: 20).

Based on the premises and normative goals discussed in the previous subsections[9], BIG2050 applies a multi-level backcasting approach, combining participatory backcasting experiments at the *local* level with the development of a desirable vision for living sustainably for the *glocal* level.[10] Both activities run in parallel and are mutually dependent and influential, although following different processes, as discussed below.

The participatory backcasting experiments consist of a series of multi-stakeholder workshops, called "workstudios", taking place in five different countries: China, Colombia, the Philippines, Ghana and Germany. The workstudio process generally follows the five steps of Quist's (2007, 2011) methodological framework for participatory backcasting[11], and its main outcomes are: creation of local scenarios for living sustainably in 2050, assessment and prioritization of impacts on/of lifestyles to be addressed today, and inputs for pathway development (country promising practices, opportunities and challenges, and offers and needs of stakeholder participants).

Based on these outcomes, the BIG2050 research team prepares a workstudio report after each event, whose main component is a country-specific action roadmap that coherently synthesizes current reality impact hotspots, the vision for 2050 and the different stages of actions needed to bridge the gap between today and the desired future. The action roadmaps serve as reference documents for action development, follow-up and further improvement of the vision and its implementation process.

BIG2050 participatory backcasting experiments are deeply rooted in two main building blocks: participation and learning. In relation to the first, each workstudio gathers around 40 stakeholders from various sectors and with different backgrounds, in order to bring together different contributions and perceptions for envisioning and attaining sustainable lifestyles. This way, it is possible to build an interdisciplinary and legitimate planning process towards sustainable living across different cultures.

A challenging aspect of participation is to extend stakeholder engagement beyond the workstudios. We will come back to this issue later in this subsection.

Regarding the learning building block, it is possible to identify at least two types of learning processes arising from the backcasting experiments. The first one, seen as an internal or local learning process, relates to the fact that the workstudios constitute unique opportunities to facilitate dialogue among different stakeholder sectors, giving participants the chance to learn about each other's activities and to identify synergies among them for future cooperation for sustainable living. A second type of learning, considered an external learning process, is realized by means of communicating the workstudios' results to participating countries, project partners, and the general public, which is currently done through the workstudio reports and the CSCP media platforms. Among the communicated results are the countries' promising practices to enable living more sustainably, which already constitute relevant steps for bridging today's reality with the desired vision for sustainable lifestyles in 2050.

Most importantly, however, is the integration of the workstudios' inputs and learnings into the process of developing BIG2050's strategic conditions for living sustainably, which altogether will

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9 BIG2050's premises bear similarities with the Dutch Sustainable Technology Development (STD) programme's basic assumptions, highlighted by Quist (2007: 26), such as the focus on the sustainable fulfilment of societal needs (although the projects differ in relation to the conceptual framework behind such focus as well as regarding the approach of means and options to fulfil needs).

10 Kok et al. (2006) register the application of an approach based on multi-scale scenarios, which consists of a quite different methodology in relation to the one applied in BIG2050, although also addressing different context levels or scales.

11 Quist's methodological framework's five steps (2007: 28-29) are: (1) Strategic problem orientation, (2) Develop future vision, (3) Backcasting analysis, (4) Elaborate future alternative and define follow-up agenda, and (5) Embed results and agenda and stimulate follow-up.

shape the project's desirable vision for the *glocal* level. That's our next focus of discussion in this subsection.

The development of a desirable vision for the *glocal* level, on the other hand, consists of a research-based activity that congregate literature review with the inputs and learnings from the five workstudios, with the aim of developing a set of strategic conditions for living sustainably in 2050 and beyond. As discussed previously, these are conditions for need-satisfiers to be sustainable and they will be related to each of the twelve lifestyle areas highlighted in BIG2050. Each strategic condition is expected to establish a two-fold prescription that potentiates satisfiers' fulfillment mandate while limiting satisfiers' negative impacts.

The inputs from the workstudio participants are mostly relevant for this process in order to achieve a more legitimate desirable vision, one that is the outcome of varied cultures, sources, perceptions and sector contributions. In this sense, the activity can be classified as standing in between a backcasting experiment and a backcasting study, as the results from the participative backcasting experiments contribute, albeit indirectly, to the final outcome (the vision) of the process.

Such set of strategic conditions constitute the key expected outcome of BIG2050, creating an universal framework for sustainable living that enables their application and tailoring worldwide, across small localities, countries and regions. This is why it has a *glocal* focus.

Looking back from this desirable vision, BIG2050 will identify the key steps towards the attainment of the vision, which will be communicated as recommendations to partners and different stakeholders. The workstudio countries will also be assessed in terms of the level of fulfillment of each strategic condition. To allow the assessment of progress in implementing recommendations and fulfilling the strategic conditions, the expected outcomes of BIG2050 also comprise a set of related indicators.

Although there is a need for local ownership to drive these recommendations and action roadmap implementation forward, BIG2050 also provides a key tool to support such process and encourage stakeholders to remain engaged with the commitments arising from the project. The tool is an online social media outlet called Global Network on Sustainable Lifestyles (www.vision2050.net), which is a platform hosted by the CSCP for communication, learning and cooperation among its members. These are some of the BIG2050 follow up elements supported by the Global Network: (i) facilitate discussions and cooperation, by means of physical or online discussion groups that focus on workstudio findings and allows match-making among workstudio participants; (ii) enable international connections, connecting stakeholders from workstudios with professionals from around the world to share experience and learning; (iii) support on an as needed basis, responding to specific queries and interests from stakeholders and cross-pollinating efforts with other sectors; (iv) capacity building, by providing insights into tools, international practice and experience, decision-making frameworks and other networks (online knowledge centres).

For a better overview specifically of the participatory backcasting experiments of BIG2050, the next section provides more details about the workstudio steps, tools and methods.

3. Workstudio structure, process and follow up

Having an European city as benchmark, each of the BIG2050 workstudios aim to uncap the burning issues in various aspects of lifestyles such as underlying values and motivations that communities and individuals must address to encourage sustainable lifestyles and what new capacities need to be developed to effect change in the ways they live.

The workstudio brings together between 30 to 40 stakeholders from diverse sectors. It seeks to engage policy-makers, business representatives (Multi-National Corporations and Small and Medium Enterprises), academia, and organized civil society into mainstreaming actions and

solutions towards social innovations, construct bridges between different activities and activate partnerships that strengthen practices of resilience, accountability, equity and citizenship for enabling the sustainable economy and lead sustainable lifestyles.

Prior to each workstudio, the BIG2050 research team develops a background research on the current lifestyles in each of the countries of the project, which covers each of the twelve lifestyles areas highlighted by BIG2050, and enables to create a series of assumptions about what the most relevant lifestyle areas for each country would be. Along the workstudio, it's possible to contrast the hypotheses derived from the background research with the participants' (citizens of the country) perceptions and opinions about the impacts on/of lifestyles currently taking place in their countries.

The target group of the workstudios comprises the above-mentioned stakeholders in five cities across the world, where the German Ministry of Economic Cooperation and Development (BMZ) has operations and that are presenting similar growth patterns in economical and consumption trends (predominantly from a growing middle-income class). The locations are:

- Africa: Accra, Ghana
- America: Bogota, Colombia
- Asia-Pacific / Oceania: Manila, the Philippines
- Asia: Wuxi, China
- Europe: Berlin, Germany

Each workstudio provides a series of action plans and potential partnerships that meet conditions for living sustainably which are included into the study of solutions for living sustainably today. All information is publicly available on the online platform launched to continue the dialogue of the workstudios and accrue knowledge: the Global Network on Sustainable Lifestyles (www.vision2050.net). More details about this online platform will be presented later on this paper.

Participants of the brainstorming process in the online platform can also sign up for the workstudios and contribute to the creation of recommendations to different stakeholders, promotion of innovative business ideas and awareness rising.

The agenda of the workstudio is designed with the support of a local partner and is meant to guide participants through a backcasting process during the entire event. It is structured in two main blocks: the morning program comprises the introduction to backcasting and the crafting of a vision based on the impacts on/of lifestyles; the afternoon program is devoted to the creation of pathways and the follow up process, thus bridging current reality with the vision of the future.

3.1. Visioning session

After the key note speeches provided by local experts, offering an overview of the country's current reality in terms of lifestyles and consumption trends, the participants split into different groups and engage in a visioning session that has the objectives to:

- Perform social research on impacts and drivers that lead to sustainable lifestyles;

- Engage different stakeholders in the co-creation of scenarios of a common future and find responsible new ways to be part of the solutions leading to that vision;

- Appeal to the emotional side as well as the rational understanding of the people in order to enable creative problem solving.

For the crafting of scenarios, participants use a tool known as "personas from the future", through which they get involved in a role-play activity portraying consumers of 2050.

Role-playing is the chosen approach as it engages people emotionally in what can be considered a "game", which is imagining how living in their cities by 2050 will be like. The rules are very simple and yet provide a rigid structure that allows participants to have a freedom of movement,

conveying an opportunity for emergent experience and personal expression (Fullerton et. al. 2008).

Game designers like Lankoski (2010) define the importance of a character as the vehicle to let emotions influence experience and behavior without the player being consciously aware of it. However, the preferences and skills of the players do play a role that defines the outcome of the game. Therefore, to craft the scenarios, participants of the workstudios get "in the shoes" of future consumers and they can understand the needs and lifestyles of people living in the future. With these characters, participants detach from their personal preferences and yet bear in mind that for these future characters to lead (or not) the lifestyle they present, today's actions of the player are a determining factor.

In summary, the "personas from the future" are tools that provide an immersive experience into the common-vision crafting process as they:

- Engage participants in future thinking;
- Challenge assumptions about the future that participants want to be part of;
- Invite other stakeholders to the dialogue and action;
- Deepen the participants' understanding of the evolving dynamics that will drive consumer behaviour over the coming several decades;
- Tap into potential social innovations.

The scenarios are crafted around the twelve lifestyles areas previously mentioned. The impacts are clearly identified by an icon (as presented in the table below) and, when needed, they have been translated into the language of the country where the workstudio is taking place. Sessions are facilitated to ensure the collection of outcomes, which are to be presented both in graphical and text formats.

Table 1. Lifestyle areas in which impacts on/of lifestyles are analysed and icons to identify them as used during the visioning sessions

Urban-rural development	Employment and work conditions
Energy generation	Education & skills development
Use of resources (including natural resources like water)	Governance
Housing	Leisure & culture
Mobility	Communication
Nutrition (Food and drink)	Health

The persona use and scenario creation session has four different sections and aims to take participants into a "time traveling" experience, presented in the figure 3.

During the first part of the session, participants receive a brief introduction of the backcasting process and how the workstudio sections fit into it. There is a recapitulation on what the keynote speakers presented as the current reality from which the participants will "travel" into 2050.
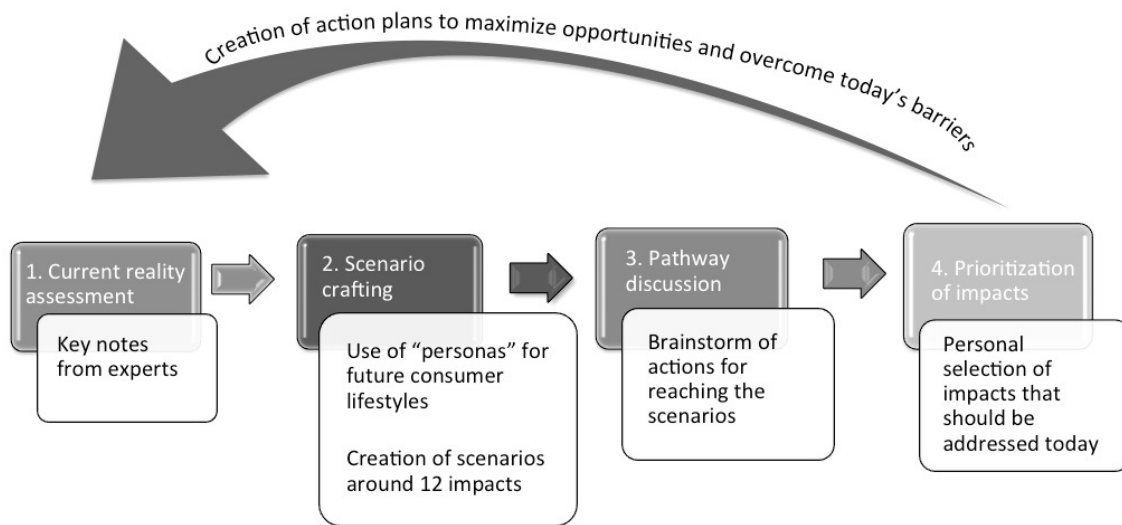
Figure 3. Diagram with all the sections of the visioning session as part of the backcasting process

The persona cards have personal information such as name, year of birth, occupation and a personal value statement that help participants to impersonate their character, voicing out their needs regarding the lifestyle area in discussion (i.e. housing – what kind of solutions for proper housing does the 80-old retired fisherman need?).

Figure 4. Example of persona ID card used during the visioning session

During this debate, participants reach consensus as how each lifestyle impact area works/looks like in a way that they all can satisfy their needs and meet their aspirations.

Reporting back to the group normally happens in an environment of camaraderie and satisfaction with the work done. Each group presents the future scenario for the lifestyle area it was responsible for, by choosing its own presentation style, from solo presentations reading out the chart with their description neatly written in bullet points, to presentations of the entire group portraying their characters and engaging in a dialogue to the public.

Figure 5. Group presenting their scenario to the plenary

The third part of the session represents a return to today and the discussion of different pathways that, starting today, can lead to the vision of 2050. At this point, the workstudio participants take a qualitative step forward towards the definition of concrete pathways to enable change.

Such pathways consist of six different strategies for reaching the complete vision of sustainable lifestyles in 2050:

        (i)   Sustainable business models;
        (ii)   Policy tools;
        (iii)   Behavioural change and social innovations;
        (iv)   Efficient value chains;
        (v)   Technological innovations; and
        (vi)   Infrastructure.

In separate groups, the participants thoroughly analyse the main concepts of the strategies and instruments as well as any related barriers and opportunities, with the aim to clarify the content of strategies and their current level of development in the country the workstudio is taking place. They also discuss the measures yet to be taken, and the factors to be overcome or leveraged. Two main questions guide the discussion:

1. What concepts, instruments and frameworks are needed today and what role does each stakeholder play to make them work?

2. What barriers and opportunities exist that can be overcome or leveraged to reach the vision of sustainable lifestyles in 2050?

To close the visioning session, participants have a moment of self-reflection to identify the areas on which more efforts have to be made today, along with the required type of measures to bring these efforts into life (political, technological, economical or social).

Figure 6. Complete vision with prioritization of lifestyle areas and correlated needed measures– one of the outcomes of the visioning session

Figure 7 below shows a graph with the prioritization per lifestyle area for every country where the workstudios have taken place so far. It is important to highlight that these are the areas to be addressed in the short (most urgently – peaked on 3 in terms of relevance), mid (2 in relevance) and long (1 in relevance) terms, in order to reach the desired 2050 visions of each workstudio country.

Impacts on/of lifestyles by relevance - workstudio outcomes
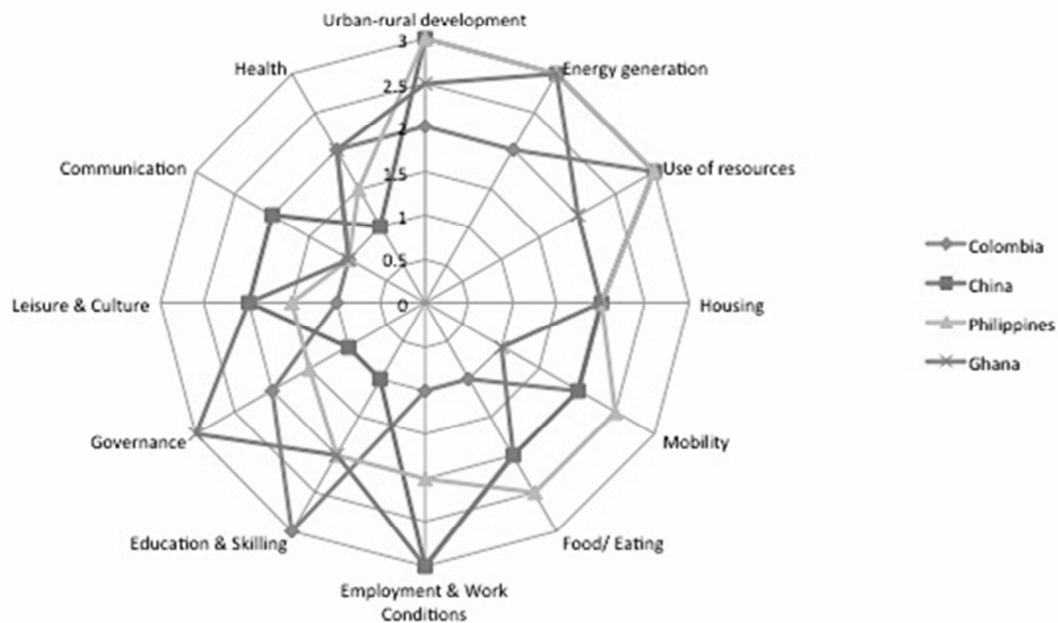
Figure 7. Impacts to be addressed in the short, mid and long terms to reach the 2050 vision – country overview

For the continuation of the workstudio, outputs from the visioning session serve as findings to create recommendations, enable targeted discussions on opportunities, challenges, needs and offers from the different stakeholders and create action roadmaps that participants can relate to for engaging into actions towards living more sustainably.

3.2. Key approach to pathway creation and follow-up of activities

Multi-sectorial engagement and collaboration are crucial elements to successfully address the negative impacts of current lifestyles and pave the way that leads to sustainable living. The pathways towards change, previously discussed as part of the visioning session, are dynamic strategies that require a collective action of various stakeholders to identify innovations for sustainability and to define and implement a common agenda for living sustainably.

Discussing business and social innovations as well as scale up strategies favorable to a sustainable future offers the opportunity to rethink the ways in which economic growth is being achieved and its related costs in terms of social development and environmental protection. Accordingly, the situation in most of the countries undergoing quick-paced economic growth demands the development of an entrepreneurial environment that can leverage innovation and lead to lifestyles that are coherent with the transition to a sustainable future.

What BIG2050 presents is that there are sustainable practices and promising partnerships that are already flourishing worldwide, and some of the best examples are known or even done by the workstudio participants. Nevertheless, in the larger picture, they still constitute comparatively isolated examples scattered over countries and, in most cases, they lack a national sustainable lifestyle agenda.

Our key approach to the creation of action roadmaps consists on assessing existing promising practices and alternative consumption niches across the workstudio countries, and bringing them together by matching stakeholders' needs and offers, expressed both during the workstudio and online through the Global Network. This way, it is possible to foster cooperation among stakeholders, and assess synergies and opportunities to both scale up innovations and initiate new ones, having the fulfillment of the conditions for living sustainably as the perceived

common goal. This process, as presented in figure 8 and explained below, is supported by the Global Network.
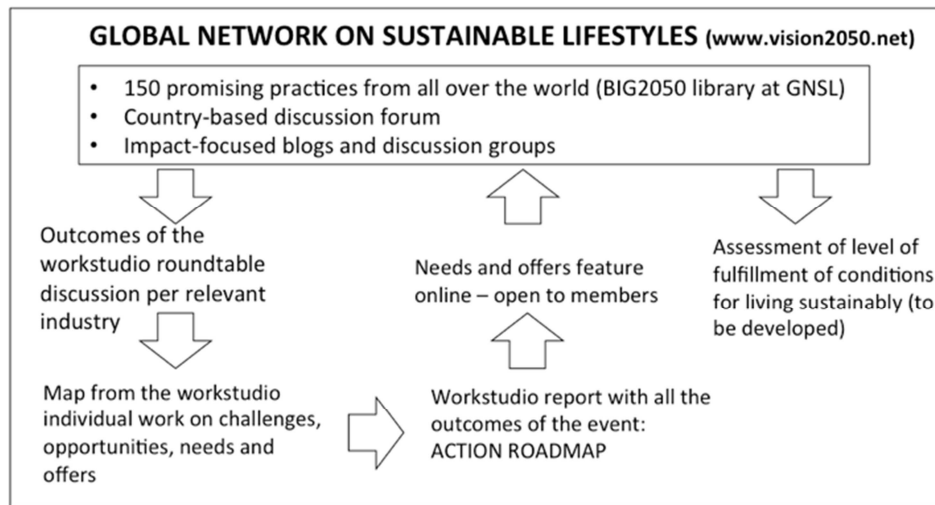
Figure 8. Roadmapping process. BIG2050 full process including input from workstudio and connection to the conditions for living sustainably.

In order to lay the "steppingstones" to create the agenda of priorities for each group of stakeholders and to shed light on potential synergies among different stakeholder groups for future collaboration, the second half of the workstudio, organized in close cooperation with local partners, starts with roundtable discussions. There are usually six different roundtable discussions taking place simultaneously. Each of them represents a different stakeholder sector (i.e. finance, R&D, social and technological innovations, business and entrepreneurship, natural resources management, and media) and is hosted by an expert of the topic.

The roundtable discussions are guided by three main questions:

1. Which success stories/examples around sustainable innovations and sustainable living happening in the country are you aware of?
2. Which of these examples have been scaled up or replicated or could be scaled up?
3. What kind of partnerships and success factors are needed to scale up the impacts on sustainable living?

After the discussions, the results from each group are presented to the plenary.

Following the roundtable discussions, the workstudio participants individually highlight the opportunities and challenges for the development and scaling up of sustainable innovations in their countries.

They also evaluate their own offerings and needs to support change, from the perspective of their personal projects/activities or generally of the sector they are part of. The result is a colourful matrix (figure 9) that is transcribed into a series of tables that enable opening the "match-making" feature at the Global Network on Sustainable Lifestyles (www.vision2050.net/your-match).

Figure 9. The analyses of opportunities, challenges, needs and offers on each workstudio. From right to left : China (activity done by working groups), Colombia, the Philippines and Ghana.

Bringing together the issues identified as trends on the background studies, the elements of the keynote speeches, the scenarios crafted during the visioning session and the analysis performed during the roundtable discussions and individual reflection, the workstudio outcomes are summarized in an action roadmap that is presented in the event's report and made available online.

After drafting the conditions for sustainable living, each country will be measured according to the indicators (still to be developed) and introduces into the country action roadmap to support the prioritization of actions and enable mechanisms for evaluation, reporting and follow up.

An example of an action roadmap is available in Annex 1.

4. Preliminary insights

4.1. The methodology

Thanks to the feedback received from each workstudio it was possible to hone the content of the session, thus enabling the participants to engage in more meaningful discussions and facilitating the cross-pollination of ideas and knowledge needed for elaborating the action roadmaps. The event seeks to have a balance between passive and active sessions. Passive sessions are the ones where the audience just listens and may have the opportunity to ask questions towards the end of the session, such as in a panel discussion or during the closing of keynote speeches. Active sessions are discussion groups with an open communication flow and aim to enable co-creation.

Some of the key findings for guiding a group of stakeholders from diverse backgrounds and ages through a backcasting experiment are the following:

- An introduction to backcasting process is needed at the beginning of the visioning session, which happening after the key note speeches at the beginning of the day. A slide with a visualization of backcasting serves as reference to explain participants what are they about to embark into;
- It is important to provide participants with a "me" time to engage them in a deeper level of understanding of the situation and appeal them to get involved in the creation of solutions towards living more sustainably today;
- Handouts with glossaries and templates are very welcomed for clarifying parts of the content and harvesting the information of discussion groups.
- A briefing of how the "personas from the future" are created, preferably with sources for some of the trends, is also very useful;

In general, each workstudio has provided enough material for the organizers to implement changes in the structure of the sessions. The methodology has proven to be flexible and appealing to participants up to the extent that it is possible to collect all the relevant information to be analyzed and translated into the results of the project.

Methodological shortcomings, such as impact analysis that reflects solely the opinion from the participants of the workstudio, are considered for the elaboration of the conditions. Using the

background research developed on the initial stages of the project, it is possible to map the priorities for each country as identified by researchers and various other institutions, and create a gap analysis to develop a more uniform scenario of areas of relevance and priorities.

4.2. BIG2050's content and goals

The country-related findings have been published in each of the workstudio reports and discussed through the Global Network on Sustainable Lifestyles.

As this is an ongoing project, the activities so far have provided an overview of the lifestyle aspirations and their related impacts across the workstudio countries. The conditions for sustainable living are in an early stage of development.

The action roadmaps generated in the workstudios are supporting the process of identifying common opportunities across countries, facilitating the process for drafting recommendations to the different stakeholders.

The increasing collection of promising practices showing that living sustainably today is possible, although not yet largely practiced, bring about some questions to be considered: how to make sustainable lifestyles desirable? How to turn sustainable living into common practice? Who is responsible of "architecting the choices"[12] for sustainable lifestyles?

To answer the later, at the current stage of the research it is possible to visualize the intention of the recommendations stemming from the research to draft the strategic conditions, as a support to different stakeholders to shape up their decision-making processes. A more detailed research can help providing indicators that will facilitate the measurement of the impact of the different decisions and actions undertaken.

5. Way forward

From the conceptual framework for human needs developed by BIG2050, in combination with the project's overall methodology, a wide range of opportunities unfolds before countries, cultures, businesses and organizations for developing creative and diverse solutions to fulfill human needs and aspirations, therefore, to shape sustainable lifestyles.

The *glocal* foundation of the strategic conditions for living sustainably in 2050 enables a dialectic two-way road that substantiates a process of mutual learning and improvement between the local and the global levels. This way, promising practices and alternative consumption niches are communicated and scaled up, helping to bridge the gap that separates current reality from the common desirable vision of sustainable lifestyles.

The strategic conditions for living sustainably are not meant to be an absolute truth about the coming transition towards more sustainable ways of living, but an starting point across different societal levels, to perceive a more balanced and long-termed relationship with the environment in which humans are equally and fairly treated. Changes in the conditions are already expected and more than desired, as the reflection of a dynamic process that pertains to a truly sustainable development.

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ANNEX 1 – Sample of Action Plan created at the workstudio in Ghana

Guillen Nicolau, Hicks (Reviewer)

PATHWAY TO CHANGE IN GHANA

DRIVERS OF CHANGE:
- Social drivers are key tools for the overall process of bridging the gap today-2050;
- Political drivers are relevant to enable the transition towards good governance;
- Technological development is important for sustainable energy generation/resource use and fair employment conditions.

CURRENT TRENDS

IMPACT HOT SPOTS:
- Fast demographic growth and urbanization;
- Poverty rate at 28.5%;
- High unemployment rate and large informal economy;
- Increased demand for imported food;
- Low access to health services;
- Threatened natural resources and productivity loss;
- Doing business is costly;
- Increasing energy consumption and scarce wood fuels;
- Transport emits half of Ghana's CO2 emissions;
- Poor housing and sanitary infrastructure.

ONGOING APPROACH:
- Unsustainable and centralized management of resources;
- Lack of governance to define a national agenda for sustainable lifestyles;
- Promising practices are isolated endeavors;
- Reported corruption;
- Poor networking among stakeholders;
- Lack of policy and financial support for entrepreneurship.

ACTIONS FOR SCALING UP INNOVATIONS AND ENABLING SUSTAINABLE LIFESTYLES

Ongoing actions:
- Research on social and economic sustainable innovations;
- Adherence to certification standards to make extraction/production more sustainable;
- Creation of alternative businesses to produce sustainable and innovative products and services;
- Improvement of banking and financial services.

Further action required to support started initiatives:
- Implement Ghana's SCP National Action Plan and other existing sustainability-related policies;
- Expand EPA's program for substitution of old energy-use products by efficient ones;
- Boost financial services and supporting technology, such as mobile money services.

Required but still not started strategic actions:
- Develop education and information systems directed towards sustainable living and entrepreneurship;
- Encourage bottom-up changes and use practical methods to communicate sustainable ways of living;
- Advance new policies to support SCP, innovative entrepreneurship and waste management;
- Boost entrepreneurship: expand tax breaks and support small, local social entrepreneurship;
- Scale-up microfinance opportunities;

VISIONS TO 2050

FUTURE SCENARIO:
- Reliance on renewable energy sources;
- Sustainable waste management and provision of clean water;
- Penalized excessive resource consumption;
- Fair working conditions and sustainable jobs;
- Sustainability-orientated education system;
- Universal and preventive health care;
- Rural communities with good social interaction, local food production and suitable job offer;
- Improved communication technology, decreasing travels;
- Revival of traditional art and eating habits;
- Innovative entrepreneurial environment.

KEY PILLARS:
- Public policies and infrastructure for sustainable living;
- Participatory decision making;
- SCP as a social goal;
- Sustainable and decentralized management of resources;
- Financial and educational support for entrepreneurship;
- Strong education and information systems.

OPPORTUNITIES
- Various business startup ideas and available expertise;
- Abundant natural resources and rapid technological development;
- Existing avenues for collaboration such as the Global Networks.

CHALLENGES
- Lack of commitment of stakeholders with SCP;
- Few investments in and high costs of doing business;
- Linking different interests into common endeavors;
- Poor democratic tools to influence political decisions.

Combining backcasting and transition management in the community arena

a bottom-up participatory method for visions & pathways for sustainable communities and consumption[1]

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Abstract

This paper presents the theoretical basis and the methodological framework of the *community arena*, a co-creation tool for sustainable behaviour by local communities and consumers. The community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to influence both how individuals think as well as how they behave. The premise is that by raising awareness and sensitivity amongst engaged citizens about other ways to look at reality, they open up to new possibilities to think about their individual behaviour in the broader societal context.

After comparing backcasting and transition management, the community arena methodology is described building on elements of transition management, backcasting, as well as adding elements from learning, and needs & capability approaches. As part of an EU funded InContext project the methodology has been tested in three pilot areas in the Netherlands, Austria and Germany; some illustrations from the Dutch pilot in the deprived neighbourhood of Carnisse in the city of Rotterdam are presented, before drawing conclusions and addressing broader relevance of the outcomes.

Keywords; backcasting; transition management; community arena; sustainable living

1 Introduction

Sustainable development initiated at and supported by the local level was made a key policy issue at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. One of its main policy documents, the Agenda 21, gives a prominent role to local authorities "because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities" (UN 1993). The leading role of local authorities was reconfirmed at the 2002 Johannesburg World Summit on Sustainable Development and over the last decades multiple Local Agenda 21 processes have been taken place all over the world. They were adopted and conducted by numerous municipalities in many countries and range from generic vision statements to formal action planning procedures (Selman 2000).

During these years, the merits and shortcomings of the Local Agenda 21 processes have become clearer. Though having lead to previously unknown levels of engagement of citizens, policy makers and stakeholders, LA21 processes did not succeed in getting beyond flagship projects. As a consequence, it has been argued that "widespread citizen engagement is unlikely to continue, unless opportunities for practical involvement are created, products are forthcoming, and encouraging feedback is received" (Selman 2000: 49). This may even lead to citizens getting worn out about participating in local bottom-up sustainability processes. The involvement methods used may raise awareness and participation by focusing on quickly reaching social consensus whilst avoiding areas of possible disagreement, but do not seem to have produced "widespread, deep-seated and long-lasting transformations" (Selman 2000: 49). Explanations include the political marginalization of the processes with no formal political decision power (Geissel 2009), the failure to produce fundamental behavioural changes (Selman 1998) and the focus on environmental issues not taking the business sector into account (Selman 1998, Gibbs et al. 1998). A major issue 30 years after the formulation of the Agenda 21 in Rio is still the start and acceleration of a paradigm shift towards sustainability at the local level.

Developments in transition management en backcasting

Next to Local Agenda 21 processes, other participatory approaches for initiating and supporting stakeholder action on sustainable development have been developed in the last decades. In the Netherlands, Canada, UK, Sweden and Belgium, significant efforts have been and are being undertaken with two participatory approaches, transition management and participatory backcasting in areas such as energy, building, health care, food, mobility and water management.

Transition management has rapidly emerged over the past decade as a new approach addressing complex societal problems and the governance of these problems towards sustainability. It is a participatory learning and experimenting process aiming at creating societal movement that can put pressure on dominant policy (Loorbach 2007, 2010). Backcasting has been defined as "generating a desirable future, and then looking backwards from that future to the present in order to strategize and to plan how it could be achieved" (Vergragt & Quist 2011: 747); over the last decades a participatory variety has strongly emerged. Both transition management and backcasting have mainly involved professional stakeholders. Recently, transition management was applied on the local level with citizens (Spekkink et al. forthcoming), while participatory backcasting has also been applied to consumption involving both citizens and consumers since a decade (e.g. Quist et al 2001, Green & Vergragt 2002, Carlsson-Kanyama et al 2007, Kok et al 2006).

The shift towards the local level and consumption and the potential of both approaches for addressing sustainability issues on these topics obviously deserves further exploration, while the interlinkages between transition management and participatory backcasting have also been neglected (Quist et al 2011, Wittmayer et al 2012). To address these interlinkages and the potential of both approaches to contribute to fundamental change towards sustainability at the local level is one of the aims of the EU funded InContext 'Individuals in Context: Supportive environments for sustainable living' project. Another key issue in the InContext project is to

support the transition to sustainable behaviour in local urban communities by aiming for a better understanding of how the inner and outer context on individual and group level interrelate with individual and collective strategies and/or practices. The objectives of the InContext project are (1) to facilitate pathways towards alternative, more sustainable behaviours of individuals and (2) to foster collective activities towards more sustainable communities (Schäpke & Rauschmayer 2012a, 2012b, Piotrowski et al 2012).

This paper presents part of the InContext project and presents the community arena, a new methodology building on transition management, participatory backcasting and social & environmental psychological literature, which has been applied in local communities in three pilot areas in the Netherlands, Austria and Germany by action research teams. The developed methodology is designed in compliance with the conceptual propositions of transition management (Loorbach 2010, Loorbach & Rotmans 2010) and participatory backcasting (Quist 2007, Vergragt & Quist 2011, Quist et al 2011), while insights from learning theories and inspirations from the needs & capabilities approach have been added.

The objectives of this paper are (1) to describe similarities and differences of the transition management and participatory backcasting, and (2) to describe the community arena methodology based on the interlinking transition management and backcasting while it has also been inspired by the needs & capability approach.

This paper unfolds in five sections following this introduction. In sections 2-3 transition management and backcasting are introduced, respectively. In section 4, both approaches are compared while focusing on elements of second order and social learning. In section 5 we describe the community arena methodology, while section 6 presents illustrates the methodology with some results from the pilot in the Netherlands. The final section provides conclusions and discussion.

2 Transition management

Overview

The last years have seen the development of transition research as an interdisciplinary field of study in which innovation studies, history, ecology and modelling are combined with sociology, political and governance studies and psychology. The transitions approach proposes that wicked problems that persist over time require a fundamental change in the structures, cultures and practices of the societal system for the system to become sustainable. The transformative processes of change are called sustainability transitions and take a long-time period (over 25 years) to materialize (Grin et al. 2010, Frantzeskaki & De Haan 2009). Because of the focus on integrated sustainability problems and the applied nature of transition research, the natural interaction between science and policy has led to a continuously co-evolving theory and practice of transition management, following the tradition of post-normal (Funtowicz & Ravetz 1994) and sustainability science (Kates et al. 2001, Kasemir et al. 2003). Transition Management builds on transition theory (e.g. Rotmans et al 2001), which includes the Multi-Level Perspective (MLP) and transitions. The MLP consists of (i) the micro-level of niches in which novelty emerges and grows, (ii) the meso-level of scoio-technical regimes which reflect the dominant ways of consumption and production and contain major sustainability problems, and (iii) the macro-level of the socio-technical landscape, consisting of trends and events in the context of specific socio-technical regimes and its niches and can influence theses. Transitions are then the structural changes, societal process and mechanisms through which novelty in niches matures and becomes mainstream, heavily influencing the dominant practices of consumption and production at the meso-level. Furthermore, Transition Management should be seen as a reflexive governance approach aiming at exploring, initiating and facilitating sustainability transitions, while taking into account system thinking, complexity and uncertainty (Loorbach 2010).

Since its introduction in the Netherlands in 2000 (Rotmans et al 2001), transition management has been widely debated, challenged, tested, and because of this further developed, enriched and embedded in the academic literature. The scientific debate has primarily focused on the theoretical side (Rotmans 2005, Loorbach 2010, Grin et al. 2010, Loorbach 2007; Loorbach & Kemp 2007, Kern & Smith 2007, Sondeijker 2009, Van der Brugge 2009, Van den Bosch 2010, Loorbach & Rotmans 2010).

Some of the main principles of transition management are as follows (Loorbach 2010):

- long-term thinking as the basis for short term policy

- thinking in terms of multiple domains (multi-domain), different actors (multi-actor), different levels (multi-level)

- (social) learning as an important aim for policy ('learning-by-doing' & 'doing-by-learning')

- direct governance towards system innovation besides system improvement

- keeping options open, exploring multiple pathways

- selective participation of so-called frontrunners
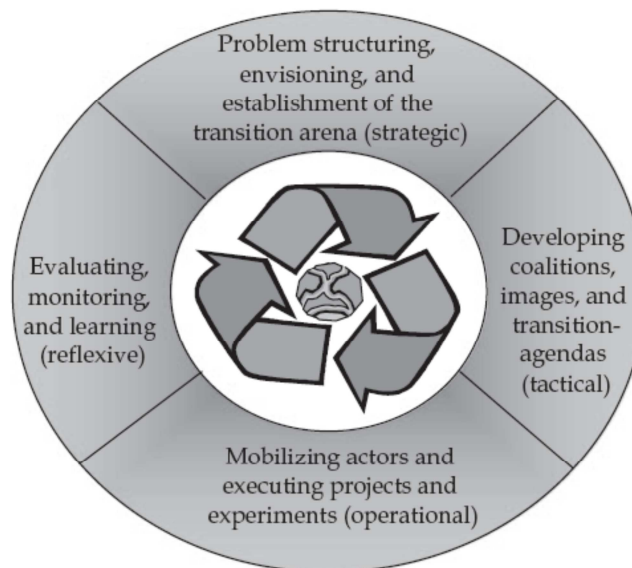
Figure 1: Transition management cycle (Loorbach 2010: 173)

For the implementation of the approach these principles have been translated in an operational model, the so-called transition management cycle (see figure 1). The four components, which correspond to activities on four dimensions: the strategic, tactical, operational and reflexive dimension, are as follows: (i) organize & establish the transition arena and structure the problem under study (ii) develop a transition agenda, images of sustainability and define transition paths; (iii) establish and carry out transition experiments and mobilize the resulting transition networks; (iv) monitor, evaluate and learn lessons from the transition experiments and, based on these, make adjustments in the vision, agenda and coalitions.

These components exhibit specific characteristics (in terms of the type of actors involved, the type of process they are associated with and the type of product they deliver) which makes it possible to (experimentally and exploratory) develop specific 'systemic instruments' and process strategies (such as participant selection, use of different types of policy and process instruments). The idea behind transition management is to create a societal movement through new coalitions, partnerships and networks around arenas that allow for building up continuous

pressure on the political and market arena to safeguard the long-term orientation and goals of the transition process (Loorbach 2007, Buuren & Loorbach 2009, Grin et al. 2010).

The starting point in a transition management process is to structure or reframe an existing societal issue in terms of the underlying problems to go beyond obvious and partial problems. The premise is that sustainability transitions require new ways of thinking and acting, which are intertwined.

Transition arena

The transition arena is a small network of frontrunners (10-15 people) that are identified and selected based on competencies, interests, backgrounds and perspectives. Participation is on a personal basis and not as a representative of an institution or based on an organizational background. These frontrunners can be experts, networkers or opinion leaders and should be prepared to commit and invest time and energy. Within the arena group there should be an equal number of frontrunners from the societal pentagon of the government, companies, non-governmental organizations, knowledge institutes and intermediaries (consulting organizations, project organizations and mediators). It is crucial that participants have innovative power (the power of new ideas), transformative power (the capacity to mobilize others for change) and to a lesser extent reinforcive power (a position within dominant hierarchy) (see Avelino 2011). The latter can be advantageous with an eye on legitimacy and financing of the process of innovation. A transition arena is a societal network of innovation, rather than an administrative platform or a consultative body (Van Buuren & Loorbach 2009). A transition arena demands a critical selection of frontrunners by a transition team, responsible for process and structure of the arena, in which experts on the process and on the transition subject are involved. As an open, evolving process of innovation a transition arena process implies variation and selection: after a certain period of time some people may drop out and others may join in the transition arena.

When such a group of frontrunners has been brought together to focus on a certain transition issue, an attempt is made to reach a joint problem definition on a system level. The core idea is that by making individual perspectives and paradigms explicit and confronting these with each other in a creative strongly interactive process, individual's inner contexts are influenced. It leads to new insights into the nature of the problem(s) and the underlying causal mechanisms which form the prelude to a change in perspective, which is a necessary but insufficient pre-condition to realizing a transition. Based on this new perspective and through discussion and interaction, sustainability visions are generated which primarily include the shared basic principles for long-term sustainable development, leaving room for dissent upon short-and mid-term solutions, goals and strategies. While there is an emphasis on consensus or at least a willingness to cooperate within a common framework, this consensus is only valid within the context of the transition network. Generally, the transition vision will oppose expectations and visions of dominant external actors, and in this sense transition visions are explicitly seeking conflict with vested interests and powers to establish a fundamental debate upon future development, the necessity of fundamental change, and the possibilities of an envisaged transition.

Transition agenda

Visions are an important governance instrument for achieving new insights and starting points, and therefore a change of attractor. The visions created evolve and are instrumental: the process of envisioning is just as important as the ultimate visions themselves. Envisioning processes are very labour-intensive and time-consuming, but are crucial to achieving development in the desired direction. This direction, as long as a sufficiently large group of interested and engaged citizens and other actors supports it, provides a focus and creates the constraints, which determine the room for manoeuvre within which the future transition activities can take place. Based on the sustainability vision, a backcasting tool (in the narrow interpretation) can be applied in which transition paths are developed and a common transition agenda is drawn up. A

common transition agenda contains a number of joint objectives, action points, projects, and instruments to realize these objectives. It should be clear who is responsible for which type of activity, project or instrument that is being developed or applied. Where the sustainability visions and the accompanying final transition images and transition objectives form the guidelines for the transition agenda which is to be developed, the transition agenda itself forms the compass for the frontrunners which they can refer to during their research and learning process.

Transition experiments

Transition experiments form the operational aspect of transition management and are innovation projects with a societal challenge as a starting point for learning aimed at contributing to a transition (Van den Bosch 2010). Putting the transition agenda into practice, transition experiments are by definition focused on experimenting and learning about different options and possibilities in the light of the long-term ambition and vision (Loorbach 2007). The strategies and activities in these experiments relate to short-term and everyday behaviour, decisions and action. At this level actors either reinforce dominating structures, cultures and practices or they choose to restructure or change them. These experiments have a high level of uncertainty and are focused on new combinations and insights. They are searching and learning processes (doing by learning and learning by doing). Ideally, transition experiments offer room for experiment and creativity and are managed in terms of conditions (deepening, niche management) and in terms of diffusion (broadening and scaling-up) (Kemp & Van den Bosch 2006, Van den Bosch & Rotmans 2008). Hence, a transition experiment is not a goal in itself, but an instrument to explore and learn about sustainability and radically different ways of meeting societal needs, now and in the future (Van den Bosch 2010).

Transition monitoring

Transition monitoring & evaluation is the reflective activity of the transition management cycle (Loorbach 2007, 2010). Due to the nature of wicked problems that are tackled with transition management processes, the emphasis of this activity is not on assessment and judgement but on learning. The activities within the transition arena and the transition experiments as well as within transition programmes (which include several transition experiments) are monitored. This is not a one-off activity but a constant flexible engagement with the dynamics at hand and requires reflexive monitoring, which is "the human capacity to routinely observe and understand what you are doing while you are doing it" (Taanman, forthcoming). It is learning in action. Transition monitoring is a cyclical and constant process supporting the learning experiences of the individual and the group who works on initiatives towards more sustainable futures. Also other stakeholders such as sponsors or target group benefit from monitoring. The results of transition monitoring processes help in (better) communicating about the initiative improving it and accounting for it.

3 Backcasting

Overview

Backcasting was proposed in the 1970s in energy studies (e.g. Lovins 1977, Robinson 1990) and later also applied to sustainability planning (e.g. Robinson 1990) and to sustainable organisations (Holmberg 1998). Several types of backcasting can be distinguished (Wangel 2011; see also Höjer et al 2011): (i) target-oriented backcasting, which focuses on developing and analysing target-fulfilling images in which the target is usually expressed as a quantitative manner; (ii) pathway-oriented backcasting in which setting strict goals is considered less important, the focus is on how change can take place and the measures that support the changes like policies, taxes, or behavioural changes; (iii) action-oriented backcasting in which the main objective is to develop an action agenda, strategy or action plan, the focus is on who could bring

about the changes and realising buy-in and commitment among stakeholders; (iv) participation-oriented backcasting (pBC) in which backcasting is used as a creative workshop tool. It must be realised that several types can be combined within a single backcasting study, though in a particular study the emphasis is usually on one or two types. In addition, the variety is even larger, as the term backcasting is both used for an overall approach (e.g. Quist et al 2011, Quist and Vergragt 2006) or for a specific backwards-looking step or tool within a methodology (e.g. Rotmans et al 2001, Van de Kerkhof et al 2003, Van de Kerkhof 2004).

Since the early 1990s it has developed into a participatory approach, especially in the Netherlands[2] (Vergragt & Jansen 1993, Weaver et al 2000, Quist & Vergragt 2006), Canada (Robinson 2003) and also Sweden (Holmberg 1998, Drehborg 1996, Carlsson-Kanyama et al 2007). Other examples of participatory backcasting can be found in various European collaborative research projects (e.g. Kok et al 2006, Kok et al 2011), while related participatory vision development and assessment projects can be found in several countries (e.g. Eames & Egmose 2011; Sondeijker 2009). Though most participatory backcasting studies involve (expert) stakeholders, examples involving citizen, consumers or end-users can also be found. Citizens were involved in vision development and backcasting workshops in sustainable urban planning (Carlsson-Kanyama et al 2007) and in developing and evaluating local and regional energy futures in Canada (Robinson 2003, Robinson et al 2011). Strong citizen involvement was also part of local vision development (Kok et al 2006) and defining sustainability research agendas in the UK (Eames & Egmose 2011). In addition, the 'Strategies towards the Sustainable Household' (SusHouse) project involved societal stakeholders like consumer associations and environmental organisation as well as consumers/citizens (Quist et al 2001, Green & Vergragt 2002, Klapwijk et al 2006, Quist 2007). Experts and stakeholders were involved in visioning and backcasting workshops, whereas three kinds of consumers were involved in focus groups in which visions were assessed and complemented.

Backcasting literally means looking back from the future. It can be defined as "generating a desirable future, and then looking backwards from that future to the present in order to strategize and to plan how it could be achieved" (Vergragt & Quist 2011: 747). It may but does not always include a focus on implementing and generating follow-up activities contributing to bringing about the desirable sustainable futures. It is a normative approach to foresight using desirable or so-called alternative futures, instead of likely or possible futures (Quist 2007). As a consequence, it is very different from regular forecasting, which looks to the future from the present and is not (or only to a very limited extend) normative. Backcasting is particularly useful in the case of complex problems, where there is a need for major change, where dominant trends are part of the problem, where there are side-effects or externalities that cannot be satisfactorily solved in markets, and where long time horizons allow for future alternatives that need time to develop (Drehborg 1996). Moreover, Giddens (2009) has proposed to use backcasting as a sustainable alternative to traditional planning, and as a tool for moving toward alternative futures when dealing with climate change. However, it should be mentioned that several authors only refer to backcasting as the backwards looking step/analysis, while they use other names for the entire approach (e.g. Van de Kerhof 2004).

More detailed overviews of the development and types of backcasting have been provided elsewhere (Quist & Vergragt 2006, Quist 2007, Wangel 2011). These reviews show a considerable variety in backcasting approaches and the way they are turned into methodologies. Variety can be found in the degree and way stakeholder participation is organised, the kind of methods that have been applied within a backcasting framework, the topics and the scale addressed (e.g. local, regional, national, consumption systems, or societal domains), and whether

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[2] In the Netherlands participatory backcasting was for instance applied at the 'Sustainable Technology Development Programme' (Weaver et al. 2000), the 'Strategies towards the Sustainable Household (SusHouse)' (Quist et al. 2001, Green & Vergragt 2002), the COOL project dealing with options preventing climate change (Van de Kerkhof 2004), biomass dialogue (Cuppen 2010) livestock breeding research (Grin et al. 2004) and in education (Quist et al. 2006).

the focus is on impact (e.g. Quist et al 2011) or diversity (Cuppen 2010 & 2012). These reviews also show that the key to backcasting is the generation and assessment of normative or desirable future visions or future images. In this way backcasting including all its varieties can be seen as part of a family of foresight approaches that share the development of normative or desirable future images. Literature on backcasting in general neglects aspects of governance and implementation (e.g. Wangel 2011), though this has been addressed in participatory backcasting studies in the Netherlands (Weaver et al. 2000, Quist et al. 2001, Green & Vergragt 2002, Grin et al. 2004, Vergragt 2005, Quist et al 2011).

Methodological framework for backcasting

Key elements of participatory backcasting are (1) stakeholder involvement and dialogue, (2) participatory generation of desirable future visions, and (3) stakeholder learning through involvement, interaction, vision development and vision assessment (Quist & Vergragt 2006, Quist 2007). Backcasting is also characterised by being problem- and system-oriented and by turning visions into immediate actions. It is as an overall approach for which a methodological framework has been developed, consisting of five steps, four types of methods and three kinds of demands (see figure 2).
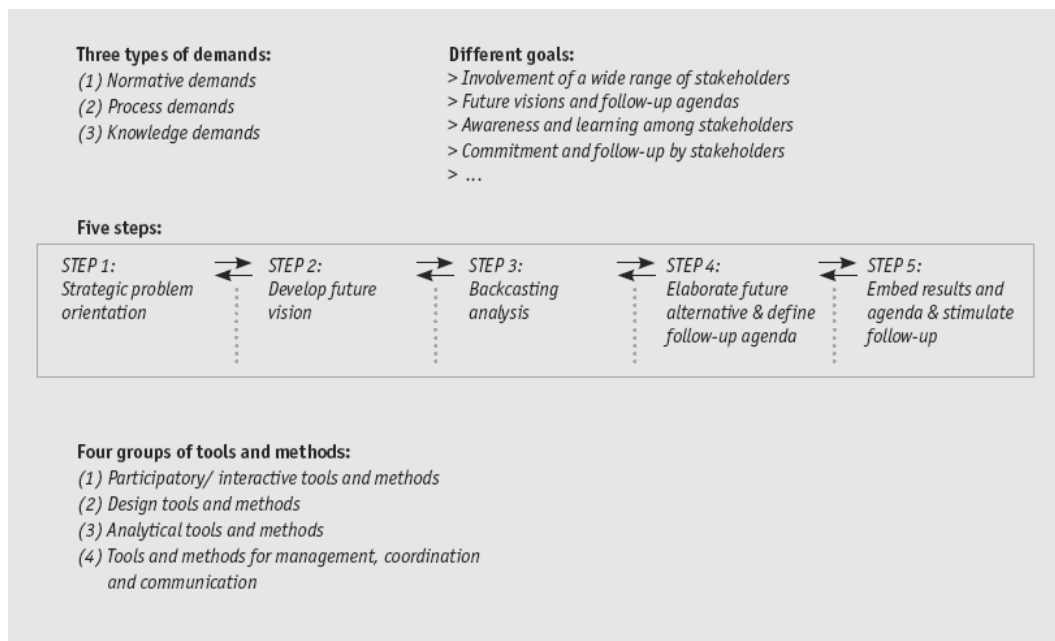
Figure 2: The methodological framework for participatory backcasting (Quist 2007: 232)

The backcasting approach reflected by the framework is not only interdisciplinary (combining and integrating tools, methods and results from different disciplines), but also transdisciplinary in nature, in the sense that it involves stakeholders, stakeholder knowledge and stakeholder values. The framework also distinguishes three types of demands: normative demands, process demands and knowledge demands. Normative demands reflect the goal-related requirements for the future vision, process demands are requirements regarding stakeholder involvement and their level of influence in the way issues, problems and potential solutions are framed and resolved in the backcasting study. Knowledge demands are needed to set requirements for the scientific and non-scientific knowledge strived for and how these are valued one to another. In addition, different goals can be distinguished in backcasting studies, which can not only refer to process-related variables, but also to content-related variables, or to a range of other variables like knowledge and methodology development. Generally speaking, stakeholder heterogeneity is high in participatory backcasting, usually because stakeholders from different societal domains

like business, research, government and society are involved, with the latter including both the wider public and public interest groups. Despite the fact that the steps are presented in a linear fashion in Figure 2 iteration and moving forward and backward between steps is likely to occur.

4 Comparing Transition Management & participatory Backcasting

From the above descriptions of the two approaches it becomes clear that transition management and participatory backcasting are closely related approaches. Participatory backcasting work of the 1990's was one of the sources for the development of transition management. In transition management practice, backcasting is understood as a single step in the transition management process (the step linking transition vision and the problem definition in the transition agenda building phase) and not as a fully fledged methodological approach (Rotmans et al 2001). Unlike in backcasting, transition management pays more attention to implementation and follow up activities, i.e. by developing coalitions and shared strategies to accelerate and guide changes within the daily context of involved actors and to govern and facilitate the implementation (Loorbach 2007, Loorbach 2010). Backcasting on the other hand has a larger diversity of practices including non-participatory studies and focuses more on the development and evaluation of desirable (alternative) images of the future (Quist 2007, Vergragt and Quist 2011, Wangel 2011; Höjer et al 2011).

In the following we will describe more similarities and differences between participatory backcasting and transition management focusing on elements of learning (i.e. second order learning processes) as this bridges the individual and group level in a participatory process. Table 1 summarises similarities and differences between transition management and participatory backcasting.

Similarities of TM & participatory BC

Both approaches share a strong focus on stakeholder involvement, stakeholder learning and the development and assessment of desirable future visions, including turning long-term visions into actions and action agendas. First and second order learning can be distinguished. In the group setting, first order learning takes place through the introduction of new knowledge whereas second order learning is conceptualised to take place through consciously confronting, questioning and thereby shifting different worldviews and perspectives and their underlying values and beliefs (i.e. interpretive frames; see also Grin and Loeber 2009, Quist 2007). All this happens in a social setting and through interaction, which links to concepts of social learning (see Garmendia & Stagl 2010 for a discussion on social learning, and & Quist and Tukker for an overview of higher order learning in innovation and consumption). In addition, diffusion of learning is important, which takes place through individuals who are able to disseminate and embed it within their organisation or network. This calls for involving, what is in TM being referred to as, frontrunners who have the ability to become such change agents.

Both approaches share the same understanding of societal change as non-linear and uncertain process. A shared activity is the development of normative or desirable future images. Both approaches see the need for iteration between future and present for developing ideas and raising sensitivity to the possibilities of multiple future pathways. Through this visioning process actors are motivated and inspired to develop further action. The vision and learning process aims also to create endorsement for the outcomes of back- and forecasting. At group level it may lead to shared ideas/beliefs, consensus (agreement or win-win) or congruence (win-win in the sense that there is no conflict in interest or values) and lateral change / shifts (moving of actors/persons toward another viewpoint). In higher order learning, indeed a distinction has been made between learning at the individual level and at the group level. It is indeed learning at the group level (Brown et al 2003), which is the seed for change and agency. Here, of course, diffusion of learning is essential, but not easy to achieve (e.g. Brown et al 2003).

A final similarity between transition management and backcasting is the focus on actors or stakeholders, whereas the changes at the actor or stakeholder level are based on changes at the individual level, which will be further discussed in Section 4.3

Table 1: Similarities and differences between transition management and participatory backcasting

Similarities	Differences
- Stakeholder participation, focus on actor/stakeholder level - Shared vision development - Higher order learning by involved stakeholders - Turning long-term visions into short-term actions & agendas - - Stakeholder commitment to results & agendas	- TM is rooted in transition theory building on the Multi-Level Perspective, BC is agnostic about system innovation theory and niches - TM has a stronger focus on developing a shared problem definition - In TM implementation and follow-up is key, whereas in BC it is more an add-on - BC has larger methodological diversity, TM has a more focussed profile

Differences

There are several differences too. First of all transition management is rooted in transition theory building amongst others on the multi-level perspective which outlines that novelty starts in niches and may replace or adjust the dominant regime (Grin et al. 2010, Grin et al. 2011). By contrast, backcasting is not rooted in a particular social system theory and is agnostic if novelty starts in a niche or in the regime itself (Vergragt & Quist 2011). Secondly, in transition management the group process of developing the sustainability narrative including problem description, transition vision and pathways are as important as the narrative itself – being part of the learning process of the transition arena participants. Backcasting primarily focuses on the process of delivering and analysing an inspiring vision linked to certain pathways and not so much on the process and the other components of the sustainability narrative. Thirdly, the focus on experimentation and generation of follow-up activities is one of the key aspects of transition management, while within backcasting diffusion activities contributing to bringing about the generated desirable sustainable futures are still an add-on. And finally, backcasting shows a larger methodological diversity, whereas transition management has a stronger and more focused profile.

The individual level in TM & participatory BC

Interestingly, participatory backcasting, as well as transition management assume higher order learning at both the actor and group level (Quist 2007, Van de Kerkhof 2004, Loorbach 2007, Loorbach 2010). Also diffusion of learning and learning outcomes through actors and individuals present in the backcasting or visioning processes is crucial for implementation and spin-off (e.g. Quist et al 2011, Brown et al 2003), whereas in TM this has been defined as empowerment of frontrunners (Avelino 2011). In fact, TM and pBC are both supporting the exploration of individual inner contexts (values, norms, motivations, problem definitions, expectations, ambitions and preferred solutions) in a group setting, while relating this process to the broader societal context.However, the individual inner context, empowerment and the (individual) learning processes are underexplored in TM and pBC

It is the absence of these aspects within TM & pBC that is addressed in the InContext project, which explicitly aims to enrich usual approaches of transition management and participatory backcasting with the inner context of behaviour, i.e. the needs, values, beliefs of individuals in case of sustainability transitions in general and sustainable ways of behaviour and living in particular (Schäpke & Rauschmayer 2012a, 2012b).

Building on Max-Neef (1991), Schäpke & Rauschmayer[3] (2012a, 2012b) distinguish between fundamental human needs that are abstract, few, and finite in number (such as freedom, affection, or subsistence, e.g. food, water, shelter) and strategies to satisfy needs (such as: having a car, caring for kids, eating a sandwich). This differentiation allows for the hypothesis underlying InContext that people can change their strategies in a more sustainable direction once they are aware of their needs and can themselves differentiate between their needs and their strategies used to fulfil these needs.

Schäpke and Rauschmayer (2012b) have proposed a circular model based on the capability approach (Sen 1985, Nussbaum 2000, Pick and Sirkin 2010) and the norm-activation model of Schwartz & Howard (1981) (see Figure 3). The capability set of a person describes the behavioural alternatives a person can choose from. It can be considered as the behavioural strategies available to a person to meet his or her needs. When deciding on which behaviour to carry out, the proposed model highlights the role of for instance awareness, attitudes and norms in the personal decision process.

Two types of feedback processes are proposed (see Figure 3). First, experiences with behavioural strategies affect individual perceptions of achievable behaviour (perceived self-efficacy), desirable and expected behaviour (attitudes, norms), perceived opportunities and skills, and also leads to learning, experiences and knowledge. Learning may not only contribute to intrinsic empowerment of participating individuals, but also to an increased capability set. Second, behavioural strategies affect the outer context aspects, e.g. by maintaining or questioning social or political institutions and policies or by changing the impacts of consumption on natural resources. As Schäpke and Rauschmayer (2012a) argue, this second feedback loop leaves room for the idea of co-evolution and joint development of inner individual and outer context aspects and behavioural strategies. In general, the impacts of individual behaviour changes on the outer collective context is rather low, but at the collective level the outcome of transition arena processes may include such feedback.
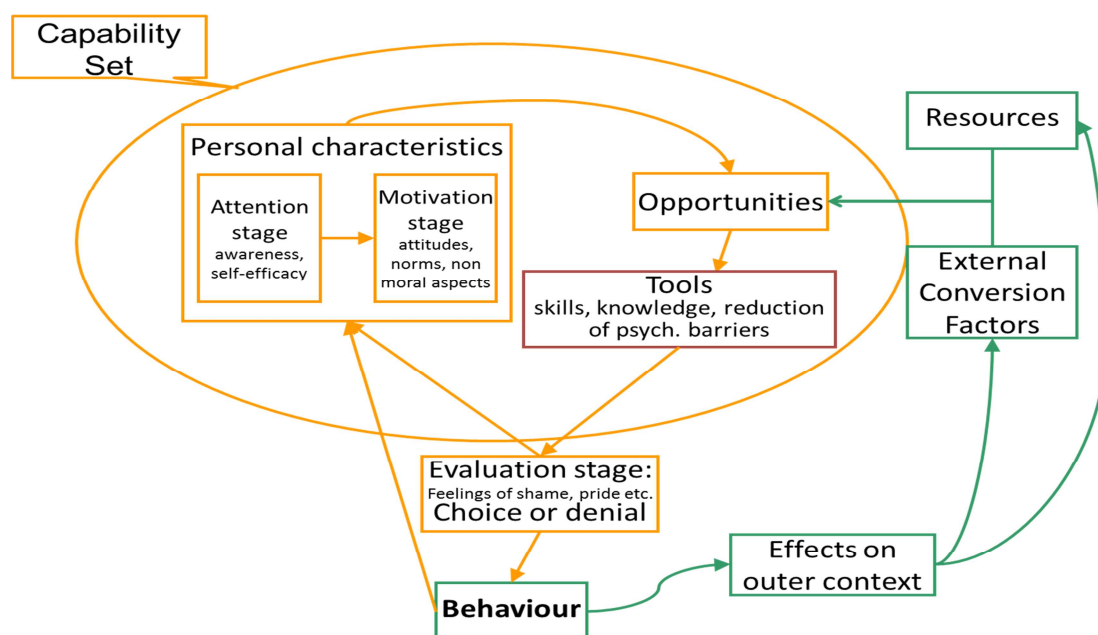
Figure 3: Dynamic norm activation capability and feedback model (source: Schäpke and Rauschmayer 2012b) Caption: inner context: orange, outer context: green

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3 The current and next paragraphs build on Schäpke and Rauschmayter (2012a, 2012b), Rauschmayer et al. 2013 and Schäpke et al. 2013; we would like to acknowledge their thinking and writing.

Saying it differently, the community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to collectively reflect on (un-) sustainable perceptions and behaviour, as well as the outer context. The premise is that by raising awareness and sensitivity amongst engaged citizens about other ways to look at reality, they open up to new possibilities to think about their individual behaviour in the broader societal context and to enhance opportunities for changing the inner and outer context in pursuit of sustainability through individual and collective processes of learning and empowerment. Whereas the model of Figure 3 offers an opportunity to connect concepts like capabilities, opportunities, behavioural strategies and attitudes and norms to concepts of learning and empowerment at the actor and group level, it still needs further development and conceptualisation as well as further integration into the community arena methodology.

5 The community arena methodology

While other processes such as the Local Agenda 21 were not producing "widespread, deep-seated and long-lasting transformations" (Selman 2000: 49) this is what the community arena is aiming for by making space for individuals to reflect on their inner context in relation to broader societal changes to sustainability. As a co-creation tool for sustainable behaviour by local communities the community arena builds upon insights of transition management, backcasting and social and environmental psychology, and it has been inspired by the feedback model shown in Figure 3. The community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to influence both how individuals think as well as how they behave. The premise is that by raising awareness and sensitivity amongst engaged actors (i.e. citizens, professionals and business) about their own and other people's needs as well as other ways to look at reality, they open up to new ways of thinking about their individual behaviour in the broader societal context (i.e. higher order learning). This should result into processes of reflection on individual and group level allowing for new behavioural strategies to emerge on how individual and groups needs are met and also into experiments with innovative practices as alternatives to established ones.

Within the community arena approach we distinguish five phases, preceded by a pre-preparation phase. Each of these phases has a different objective in the process; they consist of transition management and backcasting exercises as well as methods addressing the inner context and include a minimum of five participatory meetings (for an elaborate description see Wittmayer et al. 2011).

	Phases of the Community Arena	
	Key activities	**Key output**
0. Pre-preparation	A. Case orientation	A. Initial case description
	B. Transition team formation	B. Transition team
1. Preparation & Exploration	A. Process design	A. Community Arena process plan
	B. System analysis	B. Insightful overview of major issues/tensions to focus on
	C. Actor analysis (long-list and short-list of relevant actors) incl. interviews	C. Actor identification and categorisation + insight inner context
	D Set up Monitoring framework	D Monitoring framework
2. Problem structuring & Envisioning	A. Community arena formation	A. Frontrunner network
	B. Participatory problem structuring*	B. Individual and shared problem perceptions & change topics

	C. Selection of key priorities D. Participatory vision building*	C. Guiding sustainability principles D. Individual and shared visions
3. Backcasting, Pathways & Agenda Building	A. Participatory backcasting* & definition of transition paths B. Formulation agenda and specific activities* C. Monitoring interviews	A. Backcasting analysis & transition paths B. Transition agenda and formation of possible sub-groups C. Learning & process feedback
4. Experimenting & Implementing	A. Dissemination of visions, pathways and agenda B. Coalition forming & broadening the network C. Conducting experiments	A. Broader public awareness & extended involvement B. Change agents network & experiment portfolio C. Learning & implementation
5. Monitoring & Evaluation	A. Participatory evaluation of method, content and process* B. Monitoring interviews	A. Adapted methodological framework, strategy and lessons learned for local and EU-level governance B. Insight in drivers and barriers for sustainable behaviour

*Figure 3: Phases of the Community Arena; * meeting*

Phase 0: Pre-preparation

Part of this phase are two activities, case orientation and the formation of the team initiating and leading the team, the so-called transition team. The case orientation is a first exploration of the context within which a community arena is to take place which includes social, ecological and economic features of the context as well as active involvement of actors in the context. The transition team is the core driver of the process and should consist of 3-5 members, a strategic and content based mix of employees of the initating organization, experts in the field under study, transition management experts, change-oriented representatives from the local government and process facilitator. The tasks of the transition team are quite demanding and time-consuming; the team not only prepares, documents, analyses, monitors, co-ordinates, manages, facilitates and evaluates the whole process, but also chooses the participants and feeds them with background information and detailed knowledge. It brings together the various parties, is responsible for the internal and external communication, acts as intermediary in discordant situations and has an overview of all the activities in and between arena meetings.

Phase 1: Preparation and Exploration

In the crucial phase of preparing the stage for the frontrunners, several activities can be distinguished, process design, system analysis and actor analysis as well as setting up a monitoring framework. The transition team is getting together to determine the process design written up in a community arena process plan (output 1A) which includes the basic set up of the community arena (amount of meetings, methods used, mode and level of documentation), the time planning (amount of meetings), the communication, and other topics such as relating the arena process to relevant ongoing (policy) processes.

Both, the system and the actor analysis serve as giving insight into the local context by describing it as a system. The transition team delimits system boundaries and selects relevant stocks of the system (social, environmental and economic capital e.g. labour force, infrastructure, air quality, housing stock) along which the system is described also in time. In combination with the actor analyses this first phase is the foundation of the process and serves

as a starting point for monitoring the behaviour and input for the arena meetings. The main function of the actor analysis in this phase is to prepare the selection of participants for the transition arena. Ideally, the group is a mix of 'frontrunners' who combine creativity and imagination with the openness to evaluate and appreciate other perspectives and 'enlightened' regime actors (resource holders). It should include a diversity of competences, types of power and backgrounds.

A last activity includes the setting up of the monitoring activities. The monitoring & evaluation framework helps to adjust and improve the community arena process, to communicate with stakeholders, to justify investments to investors and to learn (participants and transition team).

Phase 2: Problem structuring and envisioning

This phase starts after the arena participants are selected (based on the actor analysis) and invited to join. In a first step the community arena is formed, and thereby a frontrunner network created (output 2A). This frontrunner group meets twice in phase two, once for a participatory problem structuring and once for the selection of key priorities and the participatory vision building.

Through a strongly interactive process a joint perception of the problem and a joint definition of the main change topics are reached in the first meeting (output 2B). The open discussion is based on the system analysis and the formulation of the main transition challenges. A secondary objective is to create commonality between participants. The selection of key priorities is one of the key activities of the second meeting which focuses on the formulation and discussion of a shared vision. In the meeting, all kinds of ideas for the future emerge. Some will be embraced and elaborated in a lively discussion; others won't be picked up (yet) by the group. A good starting point for selecting key priorities is the shared problem perception, which is translated into guiding sustainability principles (output 2C). These are the general principles formulated by the frontrunner network for a sustainable community and individual behaviour (e.g. self-responsibility, rewards for sustainable behaviour, individualized sustainability behaviour).

During the second meeting the focus is on the formulation and discussion of a shared vision. The vision is based on the consolidated problem perception and change topics as well as the guiding sustainability principles. During the meeting there are several moments for (critical) self-reflection. Facilitated by appropriate methods, frontrunners can reflect on their own needs, become aware of their strategies and their capability to influence their local environment and what this means for the vision. This way the inner context can be analyzed as well, resulting in both a shared and individual vision (output 2D).

Phase 3: Backcasting, Pathways and Agenda Building

In the next phase the arena builds upon its problem definition and its shared vision to develop actions and targets. During this phase, the interests, motives, and policies of the participants come out into the open; there are negotiations about investments, and individual plans and strategies are fine-tuned (Loorbach 2010). This is done in two participatory meetings, with the first focusing on participatory backcasting and the definition of transition paths.

Based on the sustainability vision developed, a process is initiated in which a backcasting analysis is conducted for each of the visionary images, and one or several transition paths are developed (including questions such as what needs to change, who is necessary for this change). The output is a backcasting analysis and transition paths (output 3A). Transition paths are possible routes from the present towards sustainable images and behaviour and have the same timeframe as the vision, i.e. 2030. They connect the long-term vision to the short-term action.

During a fourth meeting feedback on the final drafts of the backcasting analysis is received as well as a common agenda defined. The different perspectives on how to reach the vision and images can not only be elaborated into transition paths, but also into more short-term specific

activities, i.e. a transition agenda (output 3A). The members of the community arena are divided into different sub-groups (e.g. on visionary images, transition paths, activity-related). Step-by-step, the sub-groups will organize their work themselves. Based on the outcome of the backcasting, the sub-groups formulate an agenda, elaborate on transition paths and finally translate the agenda into activities. The agenda forms the long-term context for short-term activities and policy. The transition team and the frontrunners can choose to involve a broader group of people in this meeting, by inviting relevant parties and asking the arena-participants to invite people from their networks.

The outcome of this phase functions as a compass for future actions and experiments. By building coalitions and networks in the next phase the conditions for desired experiments are designed. Ultimately this leads to influencing behavior, policy making and lobbying. During this phase the second interview, leading to new insights on changes in the inner context of the individual participants are conducted (output 3C).

Phase 4: Experimenting and implementing

In this phase the process opens up to the public through e.g. the dissemination of visions, pathways and agenda in order to keep arena participants from abandoning the process and to create and maintain support from external actors such as general public, policy makers, interested stakeholders (output 4A). Also in this phase, strategic coalitions should be created around the subgroups established in phase 3. This change agent's network (output 4B) broadens the overall network. Specific activities as well as transition experiments should be performed through the existing networks of arena participants. This ensures on the one hand direct involvement of these frontrunners and on the other that experiments based on input from previous phases (visions, agenda, etc.). Efforts focus on creating a portfolio of related experiments which complement and strengthen each other as much as possible (output 4B). Support by policy makers can be guaranteed via an external steering group or a supportive policy arena.

A third activity relates to the operational level of transition management, the carrying out of transition experiments and actions (output 4C) aimed at deepening, broadening, and scaling up existing and planned initiatives and actions (Kemp & Van den Bosch 2006, Raven et al. 2007; Van den Bosch & Rotmans 2009, Van den Bosch 2010). The importance of short-term activities is of great importance for commitment and enthusiasm towards an arena process. The experiments have a high level of uncertainty and are focused on new combinations and insights as answers to societal challenges. They are searching and learning processes (doing by learning and learning by doing). During this phase the behaviour of the participants is monitored also. In how far are their strategies changing? Which side experiments and actions do participants undertake next to the arena-process?

Phase 5: Monitoring and evaluation

Monitoring and evaluation (of process and content) are key elements in this methodology with its focus on learning. This last phase is not sequential as the others, as monitoring is a cyclical and constant process and is performed throughout the process. Monitoring supports in communicating results to the public, in justifying investments to stakeholders and investors, in learning (participants, transition team), and importantly in adjusting the process if necessary (process design and substance of e.g. meetings, paths and experiments can be adjusted when needed).

6 Pilot projects: the Dutch district of Carnisse

Introduction

The community arena methodology is currently being applied through an action research approach in three local communities in Austria, Germany, and the Netherlands respectively. In selecting these pilots, a strategy of diversity and variety has been employed, as can be seen from the characteristics shown in Table 5. This exploratory approach allows for learning from the differences in the pilots, thereby increasing the range of learning.

Table 5: Some characteristics of the three pilots

	Finkenstein (A)	Wolfshagen (D)	Carnisse (NL)
Inhabitants	8.509	13.840	10.533
Type of community	Market town consisting of a conglomerate of twenty-eight villages of which six are dominant, situated on the border of Austria with Slovenia	Rural town (with a core city and eleven rural districts), situated in the centre of Germany	Urban neighbourhood of Rotterdam, situated in the West of the Netherlands
Characteristics	Decentralised structure, conflict of interest between tourism, population and industry, hardly any community meeting facilities, two language groups	High percentage of commuters, population decline, frontrunner in renewable energy, fading city centre	Deprived neighborhood, high turnaround of inhabitants, severe budget cuts threaten the continuation of major community facilities, around 170 nationalities, lots of considerable moving

Overview community arena process in Carnisse

This part is based on Wittmayer et al (2012, 2013a). Rotterdam is the second city of the Netherlands, counting almost 600,000 inhabitants, 127 nationalities, and until recently was the world's largest port. It is a heavily industrialized area. The city is divided by the river Maas (and the old harbour area) into a South and North part. Neighbourhoods on the south bank were historically and still are the place where immigrants move into the city. Instead of an aging population, Rotterdam has a very young population which has a relatively low level of education and a high level of unemployment.

The pilot project area is one of the neighbourhoods of Rotterdam called Carnisse. Carnisse became a city neighbourhood with the extension of the city and the harbour on the left bank of the Maas around 1900. Houses were built until roundabout 1950. Carnisse (as part of Rotterdam South) is listed in 2007 as one of the 40 neighbourhoods that the national government in the Netherlands labelled 'neighbourhoods of extra interest' ('aandachtswijken'). These neighbourhoods are all seen as having problems in multiple domains (social, physical and economical). The neighbourhood, together with seven other neighbourhoods in Rotterdam South, is still labelled as such and receives special attention and funds from the national government.

The context of Carnisse in 2011 is characterized by recent cost reductions and government cuts and a withdrawal of the welfare-state. Although old welfare structures are dismantled there is still a high level of (non-) governmental activity as well as a long history of participatory processes and interventions by professionals and/or researchers. The inhabitants of Carnisse who took part in the process (either through interviews or as arena participant) expressed their frustration on these phenomena, but were also eager to relativize the picture of a deprived

neighbourhood by pointing to the many initiatives that are arising from within the community. When looking at sustainability in terms of social, ecological and economic sustainability, the emphasis in Carnisse is on the social aspect of this triangle. For the selection of potential arena candidates the focus was on frontrunners within Carnisse, which are individuals who are passionate about their neighbourhood, who are active in the neighbourhood, those with new ideas and creative actions. This group consists of a diverse set of people (inhabitants, artists, local entrepreneurs, public officials, etc.

The Community Arena process started in August 2011. The period until February 2012 was marked by a high level of activity of the transition team in the neighborhood, doing interviews, attending meetings and getting acquainted with the locality. As of February 2012 the arena meetings took place and until May 2012 a problem description, a vision and first ideas for pathways and measures had been formulated. This vision was presented to a broader audience in the neighborhood in November 2012. During the same time a first experiment had been start, the preservation and re-opening of the local community center. In February 2013, an evaluation meeting took place where the participants evaluated the process and the outcomes and formulated future ambitions. Below focus is put on vision development and backcasting pathway meetings.

Problem Structuring & Envisioning

During the first meeting held in February 2012, the problem analysis (i.e. system analysis) was presented and the main topics of interests were identified through a group discussion. Each of the topics had multiple meanings and they were as follows: powerful/-less policy, rich and turbulent history, government cuts, diversity, connections, and maintenance of housing. In the two following meetings in March and April 2012, the participants explored their needs with regard to the community center (the focus of the action arena trajectory) as well as drew up a vision for the neighborhood for 2030 in which the community center plays an important role. The vision is called 'Blossoming Carnisse' and includes the following topics: 1) …to living with each other, 2) …to a green sustainable oasis, 3) …to diverse housing styles, 4) …to places for everybody, and 5) …to working together for blossoming.

Backcasting & Agenda Building

In May 2012, a forth Community Arena meeting was held with a focus on backcasting and developing pathways from the future vision back to the present. After having discussed and reached an agreement on the vision, three small groups worked on exploring pathways for the six topics of the vision. Under guidance of a facilitator, their task was to come up with change elements, specific activities and key actors, which were written down in a scheme. Towards the end, the transition team asked the frontrunners what they would like to do with the presented and developed ideas, vision and pathways. The idea of a neighborhood conference emerged in a group discussion. All initiatives, residents, entrepreneurs and professionals of the neighborhood were to be invited to discuss and extend on the vision and the pathways developed so far and to collaboratively come up with a neighborhood agenda.

7 Conclusions & discussion

This paper has systematically compared Transition Management and backcasting and it can be concluded that there are many shared elements, as well as differences. It became clear that both approaches have a lot in common such as e.g. the focus on vision building as a guideline for short term action and the understanding of social change as complex and non-linear. The synthesis showed that both approaches are also complementary in certain aspects, e.g. the methodological diversity of backcasting and the focus on follow-up activities and network broadening of transition management.

By adding individual aspects from capability approach & needs-opportunities approaches, the more sophisticated Community Arena methodology could be developed enabling to address local communities and consumers better for addressing sustainability issues by enhance participation at the local level and in transitions to sustainable lifestyles and sustainable consumption. The community arena is meant as a co-creation tool for sustainable behaviour by local communities. It assumes a reflexive learning and experimenting process, through which frontrunners develop a shared sustainability vision of their community and initiate actions towards its fulfilment. This process includes reflections on individual inner contexts in a group setting so as to influence both how individuals think as well as how they behave. These learning processes, achieved through consciously confronting, reflecting and questioning different worldviews and perspectives and their underlying values, attitudes and beliefs (interpretive frames) of individuals, may lead to changes in individual inner context and individual as well as collective behaviour.

The community area has been tested in three local communities in Austria, Germany, and the Netherlands. The Dutch case is a deprived neighbourhood in Rotterdam from which some results have been presented. Further methodological and conceptual evaluation is partly available, but further substantiation is needed. Interesting points are to what implementation has been achieved and can it can be stimulated and embedded. Also, further connecting the community arena methodology to the needs & capabilities feedback model on aspects influencing individual behaviour has been done and will be reported on in other papers at this workshop.

Acknowledgement

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Discussant Contribution

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The first paper was by Georgina Guillen and Mariana Nicolaul (BIG2050: Because living sustainably today is possible!). It largely reports on a German Government-funded initiative (BIG2050) to explore individuals' lifestyles and aspirations towards the development and subsequent promotion of conditions towards sustainable living in the future. It usefully and thoughtfully starts by reviewing the role of humans needs and satisfiers by using Max-Neef's model, followed by a refreshingly participatory methodology pursuing the way in which strategic conditions to live sustainably can, in the form of reinforcing satisfiers and attenuating impacts, influence the fulfillment of human needs as described by Max-Neef.

The second paper (Combining backcasting and transition management in the community aren: towards an participatory vision and pathway methodology for sustainable communities and consumption) was by design less empirical and more conceptual. It tried to integrate the fields of Backcasting and Transition Management by evaluating their respective roles, methods and functions in developing, and subsequently promoting, vision-specific pathways. In doing so, it highlights usefully the growing convergence between backcasting and transition management, which is helpful as both supplement each other, and does so in the context of the primary goal of either practice – what is it we are actually trying to achieve is a precondition of any deliberative (or practiced) process on how to get there.

Both papers address a very similar question from very different angles – how can we conceptualise and subsequently attain (or at least approximate) sustainable lifestyles in a process that relies upon, and thus fosters, social inclusion? In doing so, both papers call, with varying urgency and extent, for innovation as a driver towards low-carbon and sustainable lifestyles. However, it is curious to note that both papers omit 2 notions that underpin and overlap either paper, one is the conceptualisation of innovation by Schumpeter, the other is the much earlier concept of reference groups, as first espoused by Merton.

Schumpeter was arguing that the key to success and, ipso facto in this context of Transition Management, of change, is the entrepreneur, who in a process of "creative destruction" is pursuing new ideas the success of which then allows existing technologies to fall back and behind. In this sense, path dependency can be overcome in a Schumpeterian sense by success in innovation, either in adjacent or mainstream technologies. This matters for both papers as it is one of the ways in which Guillen's visions can be realised (albeit the market-dependence Schumpeter assumes may provide a reinforcement towards the (social) market not all sustainability pathway proponents may like to support) and provide a way in which Quist's Transition Management ideas can break out of path dependency – or of entrenched pathways generally.

In addition, both papers can rely on Schumpeter's ideas of innovation a little more, as both seek to assure the reader that low-carbon, sustainability visions are feasible – which Guillen does directly, and that they are attainable – which is the core of Quist's promotion of backcasting as an inclusive tool for the promotion of said visions. Where they, in a way, differ is the basic tenet of their approach: Guillen focuses in the endpoint and how to define it, Quist emphasises much more the process that gets us towards the endpoint.

The second strand that is underpinning both but are discussed only implicitly is the idea of reference groups, first raised by Robert Merton in the 1950s, broadly defined as any group that individuals refer to in their behaviour. The concept has found its way into Transition

Management theory and into the discussion about change and its logic in the form of "Leitmotifs" or of charismatic individuals (or groups) that are in a position to influence others by virtue of their behaviour, espousal of beliefs, or assertion of ideas. Guillen argues that such individuals are important for the development of the vision as well as its promotion. Quist would agree with this, highlighting the role of (reference groups) for the development of pathways which, found in application of backcasting and enshrined in a Transition Management plan, would make implementation much more socially inclusive, and thus acceptable and somewhat easier.

Methodologically, the papers are very different by design, though. Guillen produces a very persuasive set of ideas for the development of visions, and their evaluating. It falls a little short in the continuation of, for instance, Max-Neef's ideas of human needs, as they could be used for the interpretation and subsequent evaluation of the visions – how would individuals meet their needs in 2050? By contrast, Quist is trying hard to gel the overlapping methodologies of backcasting and Transition Management by arguing that empirically, they are used more and more in an integrated manner anyway, and arguing conceptually, that they are two different aspects of the same vexing problem of how to develop viable pathways towards a more sustainable future. Backcasting is then a tool the works best in the assessment of what is and what could be. This "Gap Analysis" could function at many different levels, and at the level of the individual or the household, Max-Neef's ideas build the link to the backcasting activities in Guillen's paper as well. By contrast, Transition Management is concerned with the development of suitable pathways, so that, at the nexus of "how to do what and when", backcasting and transition Management meet and overlap. Both are concerned with the Anatomy of Change, and can be applied to the Multi-level Perspective with some ease. In this, Innovation is a central tool, Transition Management is the process and backcasting is the method to develop such futures.

Discussion Report

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Main points from the discussion are as follows.

One interesting question is how does the Transition Management framework fits in with the Back casting framework. Both are a generic process strategy, thus not prescriptive, and having strong similarities.

Transition communities globally are facing similar issues. There is a lot outside of Europe that we are not aware off, but with similar aspirations, and from which a lot can be learnt in Europe

Role playing reveals opportunities for learning. This playful technique could be further elaborated to benefit from it in transition studies.

Data reduction can be a problem of data analysis. The richness of the underlying data disappears in the analysis. The richness of the material is often interesting as inspiration for similar session and it can provides meaningful insights.

In order to transfer the results from one specific setting to a more general level it is also very important to clarify on what basis the participants were selected, as this influences the outcomes.

We are focussing on sustainable practices on a very small scale. However, diffusion to a larger scale is needed, which raises questions like 'What are the similarities and differences between small scale practices and large scale? What is needed to initiate and facilitate large scale practices?'

Going beyond niches, can also means going beyond sectors and regimes. Are these levels sufficient in the Multi-Level Perspective? The level of the niche-regime containing new institutions and structures can be a relevant additional level, also enabling the niche to grow independent of the regime in some cases. It is also interesting to learn from alternative counter-movements. This is where social change starts too. Then it is important to develop networks, your own niche-regime-integration from such subcultural context.

Participants in studies tend to make great visions of desired and glorious futures. But what is then a sustainable future? And who decides what sustainability is? There are different perspectives on this, so it needs at least to be transparent.

Although we are action researchers with a clear aim and focus for the future, it is not fighting regimes, but to look for more sustainable alternatives beyond the regimes. Looking back on how societies got rid of unsustainable practices (for instance through choice editing and regulation) shows interesting examples like the ban on smoking and recycling becoming normal. Even though strategies like choice editing and regulation may no longer work in the current or future zeitgeist, these can still be helpful in setting conditions.

1b

Principles and innovative value creation for sustainable consumption pathways

Organising principles of pathways towards sustainable consumption

Actions, assumptions, and appropriations

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Abstract

Whether a transition occurred and how a given project or initiative contributed to it can only be studied in hindsight. However, talk about "transitions towards sustainability" and claims to contribute to said transitions abound. In this paper, activities that are thought of as contributing to sustainability transitions are conceptualised as "transition efforts" and the focus is on the question how transition efforts become organised along particular pathways.

The central analytical concepts are the *institutional entrepreneur* (DiMaggio), an individual or organisation aiming to institutionalise different, possibly novel institutions, and *sensemaking* (Weick), the process of comprehending circumstances and deciding on actions based on these interpretations. Thus, this paper (i) catalogues actions taken by actors engaged in transition efforts, (ii) explores their written and spoken narratives regarding assumptions about what is at state and why their responding strategies should work and (iii) examines the appropriation of common narratives and assumptions. In addition, we interrogate what these assumptions imply for the transition efforts they help rationalising or legitimising and how these efforts may suffer shortcomings due to unfounded or disregarded assumptions about their effectiveness.

This paper analyses four exemplary cases in the domain of sustainable food consumption in Germany and finds that each initiative is structured by a set of assumptions that is often present as more or less coherent narrative, which is shared and can be referred to as a resource. Due to their action and actor coordinating power we labelled the found sets of assumptions "organising principles" and distinguish the principles of green consumption, sufficiency and collective experimentation.

Introduction and rationale

Numerous efforts try to contribute to a transition towards more sustainable societies. Transition research has delivered relevant insights into the multi-actor and multi-level developments involved in regime shifts towards sustainable development. Much thinking and research has also been dedicated to the notion of managing and steering transitions or to developing pathways towards sustainability. This raises further questions how the various transformational activities and decisions that form part of a transition interrelate and become organised amidst its occurrence.

In this paper we address the broad question how transition efforts are organised. Clearly, there is no single, ruling entity directing efforts within and across levels. There are, however, *shared assumptions* that govern actions and mould ongoing transition efforts. *In this paper we label these assumptions about what is at stake and why it should work as 'organising principles'*. Thereby, this research aims to trace such assumptions in current transition efforts towards more sustainable ways of living, to answer the question how *organising principles* in sustainability transitions can be characterised. What are the schemes that inspire sustainability interventions? What are the forces that pathway constructors or transition contributors expect to be at work? We investigate four policy-initiatives in the German food domain that aim to render food production and consumption practices more sustainable. The rationale of this research is that transition efforts may suffer from unacknowledged assumptions about their efficacy.

Conceptual underpinnings

One question is what motivates people in trying to make a difference for themselves, their city and their fellow citizens – and the answers to this question are likely to be as manifold as people are. Another question is what it is that ties engaged citizens, entrepreneurs or policymakers together and towards particular goals. A likely partial answer is a shared (and possibly growing) feeling of responsibility and urge to take action. Another answer may be the enjoyment of being allowed to take decisions, to try and test, to learn and discard – and in so doing to implement changes, observe their effects and move on from there. At the same time, an appreciation of sharing and developing knowledge, experience and skills, presumably, also plays a role. These observations resonate with findings from creativity research that tries to understand under what conditions opportunities to be curious and explore unfold and where, hence, creativity can come to the fore (Mumford, 2003).

Traditionally, transition research concerns itself with the intricate interplay of technological, political, environmental, social, cultural, etc. processes and the actors and networks involved in those within and across three analytical levels, the niche, regime and landscape level. Further, it seeks to identify patterns in the trajectories an unfolding transition follows, impacted by particular phenomena (Lachman, 2013). Thereby, transition research has drawn attention to the necessity and yet, impossibility to steer, direct or even manage transitions. A question that, so far, received little to no regard is how various actors make sense of ongoing developments and find strategies to respond to or become involved in transition efforts.

In addition to the transition literature, this research, therefore, draws on work in organisational science, in particular on *sensemaking* (Weick, Sutcliffe, & Obstfeld, 2005). The basic idea is that in their interpretations and decisions, actors follow particular logics and search heuristics. By putting these notions central, we also relate to the conceptual work of Grin and van Staveren (2007) who stressed the so-called "system-innovating core idea" in transition processes to foster support among important stakeholders and to ensure lasting system-innovating changes. Just like others before them (Hoppe, 2010), Grin and van Staveren emphasise that to achieve system change, also the definition of problems, the search for solutions and the production of knowledge need to change. A system-innovating core idea can potentially support such innovations in the framing of problems and in guiding the search for solutions.

In his famous book on *Sensemaking in Organizations*, Karl Weick (1995) identified key aspects of sensemaking processes; the starting point being that the social world does not simply appear to people but is continuously constructed through labels and narratives. Weick presents and develops his ideas on the role and functioning in the following seven aspects:

1. Identity: it is constructed who the "I" or "we" is;

2. Retrospective: looking backward to make sense of what happened;

3. Enactive: people simultaneously interpret and create their world;

4. Social: it is never an individual achievement, but deeply social;

5. Ongoing: sensemaking never starts and never stops;

6. Extracting cues: people use 'cues', or points of reference, that enable sensemaking;

7. Plausibility over accuracy: plausible representations matter more than accurate ones.

Organisational science dealing with institutions in the form of shared cognitive frames has traditionally concerned itself with continuity and stability. Only in the past years, increased attention has been paid to institutional change with scholars tracing the workings of novel cognitive frames that are involved in the divergence from the mainstream in "thought or deed" (Garud, Hardy, & Maguire, 2007, p. 959). The challenge this divergence connotes is known in the field as the paradox of "embedded agency" and prompts the question how a group or an individual can swerve from the assumed strong conditioning of its institutional framework and institutionalise new frames and practices (Mutch, 2007). This resumption of the classic structure-agency dilemma in relation to institutional change has triggered the development of the notion of institutional entrepreneurs who

> *'deploy the resources at their disposal to create and empower institutions. Institutional entrepreneurs serve as agents of legitimacy supporting the creation of institutions that they deem to be appropriate and aligned with their interests' (DiMaggio in: Dacin, Goodstein, & Scott, 2002, p. 47).*

Since sensemaking involves the explicit comprehension of circumstances and, in this understanding, action follows from interpretation, one approach to gain insight into how institutional entrepreneurs deflect from commonly held frames of reference is the study of words and texts (Weick, et al., 2005). Thus, this paper explores written and spoken assumptions of actors involved in transition efforts about (i) what is at stake and (ii) why their responding strategies should work to shed light on the question how transition efforts become organised along particular pathways amidst their occurrence (see Figure 1). In other words, in this study we focus on institutional entrepreneurs who engage in sustainable consumption projects, i.e. transition efforts, that seek to bring about fundamental changes, and consider the notions of sensemaking and legitimation useful to study how these transition efforts are organised.

Theoretical starting point: **Sensemaking**
1. Identity
2. Retrospective
3. Enactive
4. Social
5. Ongoing
6. Cues
7. Plausible
	Type of actors and data analysed:
	• **Institutional entrepreneurs**
	• **Words & texts**
	  o Project plans
	  o Project evaluations
	  o Brochures
	  o Websites
	  o Interviews
		Aspects of transition efforts studied:
		• Defined problems
		• Assumed solutions
		• Goals
		• Approach
		• Tools
		• Rationales

Concepts and data to trace Organising Principles of Transition Efforts

Figure 1: Conceptual underpinnings and empirical approach

We have selected four policy initiatives that aim to support more sustainable food production and consumption practices in Germany as example cases. In the discussion, we focus on the narratives actors evoke with respect to their views on human beings, their choices and behaviours as well as on societal challenges and their possible solutions. In addition, we interrogate what these views imply for the transition efforts they help rationalising or legitimising and how these efforts may suffer shortcomings due to unfounded or disregarded assumptions of their effectiveness.

Methods

Strictly speaking, it can only be decided in hindsight whether a transition occurred at all and how a given project or initiative contributed to it. Yet, many actors partake and give shape to changes underway and engage in various activities that are inspired by an envisioned transition. In this paper, these activities are conceptualised as "transition efforts".

We examined four policy initiatives aimed at supporting more sustainable practices with respect to food consumption routines. The cases chosen are all based in Germany and include the *Bio-Siegel*, the label marking organic produce that was introduced in Germany in 2001, the *aid-Ernährungsführerschein (food licence)* for primary school children, the *Zu gut für die Tonne (Too Good for the Bin)* initiative that aims to reduce food waste and *Die Essbare Stadt (The Edible City)*, an urban farming initiative in the city of Andernach. This selection of cases is motivated by the attempt to cover a range of approaches and instruments across which organising principles are traced in the analysis. Table 1 provides an overview to capture the variety covered in terms of the implementing policy levels and the employed instruments.

Table 1 Overview of selected cases

Case	Implementing policy levels			Policy instruments				
	federal	state	municipal	regulatory	economic	informa-tional	infra-structural	institu-tional
Organic Label	x			x		x		x
Food waste initiative	x		x			x	x	x
Food Licence	x	x	x		x	x		x
The Edible City			x		x	x	x	x

For each case, web-based information was collected in a template for structured comparison and analysis. We focused on the actors involved in the initiative, the targets pursued, the theoretical framework used (if mentioned explicitly), the instruments employed, the projects, products or activities implemented as part of the initiative as well as its direct and indirect effects. For two cases, information from the Internet was supplemented by interviews to enrich the empirical basis for analysis. For the Food Licence initiative, the project manager, and for The Edible City initiative, one of the project developers and a landscape architect involved as project evaluator, were questioned in the form of semi-structured interviews. Based on the narratives we encountered in written or spoken word, an analysis was conducted of the (frequently implicit) assumptions and logics underlying each initiative. In the following, we will first present the four cases and then discuss sensemaking aspects, underlying assumptions and their implications.

Description of actions – the four cases in brief

Case 1: The organic food label initiative – *das Bio-Siegel*

In September 2001 ([BMELV](#)), Germany introduced a label for all produce compliant with the Council Regulation (EEC) No 2092/91 on organic farming and agriculture ([EEC, 1991](#)). The declared goal of this policy initiative was to establish a single, known, trusted and transparent label for organic food in Germany to replace the many logos in use at the time that each adhered to different standards. The *Bio-Siegel* initiative, therefore, involved the national recognition and more rigorous implementation of international standards as well as frequent, at least yearly, assessments by

independent, certified controllers. The percentage of agricultural land used for organic production has increased from 1.6% in 1994, to 3.7% in 2001 and to 6.1% in 2011 ([BMELV](#)).[1] Between the introduction of the Bio-Siegel in September 2001 and December 2012, the amount of registered Bio-Siegel products has increased from just over 1,200 to almost 66,000 ([BLE, 2012](#)) and continues to rise despite the existence of an EU logo for organic produce since July 2012. The EU logo is based on the same standards and its use is obligatory for all organic produce compliant with those. German producers or retailers are nevertheless still allowed to apply for and use the German Bio-Siegel in addition to the obligatory EU logo ([European Commission, 2010](#)).

The declared goals of the Bio-Siegel were to emphasise EU standards for organic farming and to offer guidance for consumers through the jungle of existing labels and claims. This host of logos, labels and claims about 'environmentally friendly' and 'ecological' products on the market was hence the problem targeted by means of a uniform label and supplementary information via online and print media about the design, meaning and control mechanisms behind the label.

Although this analysis is not meant as effectiveness evaluation, it is worth pondering whether the declared goal has been achieved. The Ministry aimed to strengthen internationally agreed standards by creating a single, uniform organic label accompanied by a control system that rendered all labels based on lower standards less trustworthy. However, the obligatory EU logo for organic products, which is based on the same standards, has not substituted the Bio-Siegel in the first fourteen months of its existence. Instead, the, among German consumers much better known, Bio-Siegel is frequently featured alongside the EU logo.

The Bio-Siegel communicates to people that the product they consider purchasing was organically produced in accordance with EU legislation.[2] The EU-wide successor solely shows twelve white stars in the form of a stylised leaf on a green background. The lack of explicit mentioning of "eco", "bio", or "organic" in writing, may, in addition to the former label being a decade older and hence better known, be one of the reasons why many producers and retailers continue using the Bio-Siegel in addition to the EU logo.

Furthermore, a number of initiatives by producers and retailers, e.g. *Bioland*, *Naturland* and *demeter*, make use of stricter standards and continue using their labels next to the EU logo as well as the Bio-Siegel. In addition, most retailers have created their own, easily recognisable organic brands and display the EU logo, occasionally accompanied by the German label on the package, yet not necessarily prominently. In other words, the co-existence of numerous organic labels persists.

Case 2: The food waste initiative – *Zu gut für die Tonne* (Too good for the bin)

Upon its premier in Germany in February 2011, the documentary Taste the Waste triggered a public debate by showing how approximately 50% of all food in Germany is wasted on its way from the field to the plate. The Federal Ministry for Food, Agriculture and Consumer Protection (BMELV) subsequently entrusted the University of Stuttgart with a study to determine the actual amount of food waste and to evaluate strategies for reduction. In March 2012, the BMELV hosted a conference with stakeholders from industry, retail, gastronomy, agriculture, consumer organisations and NGOs to present the research findings (e.g. about 30% of all food bought by private households is thrown away ([Kranert et al., 2012](#))) and to discuss cooperative strategies for food waste reduction.

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[1] These figures nicely show that the increase in organic agriculture is not (at least not in its entirety) due to the labelling initiative as its proportion of the total amount of cultivated land increased prior to the introduction to the label already.

[2] The label reads "Bio nach EG-Öko-Verordnung" which means "Organic according to EU-Eco-Directive".

In March 2012 a nation-wide awareness campaign under the banner of "Teller oder Tonne" *(Plate or bin)* started off, targeting the best before date and its appropriate interpretation. In April of the same year, the BMELV launched the "Zu gut für die Tonne" *(Too good for the bin)* initiative which consists of a number of instruments, e.g. a website and an app to inform private households about food waste and how to avoid it, a number of action days in different cities in cooperation with the *Bundesverband Deutsche Tafel* (an organisation collecting food from restaurants and supermarkets that would be thrown away but is still edible and offers it for free or at very low cost to the poor), churches and Slow Food Deutschland to raise awareness. Additionally, the BMELV cooperates with the German hotel and restaurant association to reduce food waste in the hospitality sector by, amongst other, establish doggy bags and offer varied dish sizes.

For evaluation purposes, a number of efforts were undertaken. A survey conducted in March 2012 showed that 81% of the German population above the age of 18 had taken notice of the discussion on food waste in the media and about 20% (23% of the female and 14% of the male population) stated they had already made changes to their ways of dealing with food and food waste (BMELV, 2012). Unfortunately, the survey did not ask for specifics about new behaviours or strategies adopted. In November 2012, Infratest dimap conducted a representative survey to evaluate several aspects of the food waste initiative. Key findings were that 95% of the German population support the goal to reduce food waste and 51% had heard about the BMELV food waste initiative. 26% stated that they are handling food more consciously while 73% said they hardly changed their behaviours. 97% of the people surveyed consider *Tafel* initiatives worth supporting and 50% could "certainly" and 35% "potentially" imagine becoming personally involved (Infratest dimap, 2012). In other words, in terms of awareness and good intentions, the food waste initiative delivered impressive results while actual changes remained limited and details unmonitored.

Case 3: The Food Licence for children – *der aid-Ernährungsführerschein*

The Food Licence initiative forms part of the IN FORM programme, a national action plan of the German Federal Ministry for Food, Agriculture and Consumer Protection (BMELV) to address the prevention of malnutrition, lack of physical exercise, overweight and related diseases. The Food Licence targets primary school children aged eight to nine (BMELV & BMU, 2011) and aims to teach about a healthy diet, food preparation, hygiene and table manners in six or seven practical sessions, including two playful "assessments" in form of a quiz and a practical test. The initiative offers an information kit for teachers, including letters to parents in several languages and a presentation to explain the aims and content of the Food Licence to colleagues and parents as well as the service to hire an expert to join the sessions. In addition, a booklet is provided for the kids with explanations, tasks and recipes. By March 2013, after six years of its existence, over 580.000 children had acquired a Food Licence.

In each of the sessions, a different theme is central, e.g. breakfast, salads, cold snacks or warm dishes, yet the goal to teach theoretical knowledge whilst practicing skills and enjoying the activities remains. Children are supported in reading and experimenting with recipes and encouraged to carry out all tasks as independently as possible (aid).

This initiative frames a healthy and more sustainable lifestyle as one involving a balanced diet including freshly made food. The problems targeted by means of information for teachers and parents and practical sessions for children are the dwindling knowledge about what constitutes a healthy diet and skills to prepare self-made food, also among parents. The large coverage of the initiative to date is not only due to clever marketing by the BMELV as the main financer or the *LandFrauen Verband* (Countrywomen's Association), i.e. the experts who can be hired as in-class supporters, but also due to the teachers' frustration and active search for help motivated by the

frequent encounter of children who arrive at school without having had breakfast or with only sweets and candy in their lunch boxes (B. Kaiser, personal communication, Sept 11, 2013).

The keys to success that trigger long-lasting knowledge and behaviour change appear to be experience and experimentation rather than lecturing and indoctrination. An evaluation among 77 classes across Germany found that the initiative has positive and lasting effects (tested after 6 months) with respect to knowledge, motivation, competences and behaviours related to a healthy and varied diet, food preparation, hygiene and table manners. The evaluation also showed that children greatly enjoyed participating. Parents noted that children after participation were keener to help with grocery shopping and food preparation and also paid more attention to hygiene and table manners (Sommer, Ekert, & Otto, 2011).

Case 4: Public urban gardening – *die Essbare Stadt* (The edible city)

In 2010, the garden architect Heike Boomgarden and the geo-ecologist Lutz Kosack, who works at the municipal urban planning department of the city of Andernach, developed a concept of urban agriculture with the aims to reduce care and maintenance cost of public green spaces, to provide employment and qualification opportunities for long-term unemployed, to improve the city's eco-balance[3] and to make people aware that public space is their space (and not the municipality's), e.g. by allowing them to pick herbs and ripe fruits and vegetables for free and involving volunteers in care-taking.

This urban gardening initiative runs by the name *Essbare Stadt* (Edible City) and does not follow a fully worked out project implementation plan. Instead, the plan evolves and subsequent steps emerge as the project develops. This is remarkable since public expenditures are often tied to specific targets and require detailed planning. Due to the fact that no additional cost were involved, however, the municipality gave the project managers plenty of rope and allowed the testing of different approaches and letting the project grow slowly according to its own speed.

Three and a half years later, the initiative has expanded from a permaculture project that had already been in place outside city borders and provided training and work for long-term unemployed, to agricultural plots in a number of sites throughout the city, the most prominent being a large plot in the moat of an old castle in the city centre. Numerous citizens, school classes and voluntary groups are supporting maintenance of public plots or created gardens on their own premises, an organic fair trade shop is selling the permaculture produce in the city centre and urban agriculture courses and workshops are offered to interested locals and externals by Boomgaarden, Kosack and other experts. Over the years, Andernach has won the internationally recognised gold award of the *Entente Florale* twice and a "liveable city" award.

Since the early stages of this initiative, the project implementers sought close cooperation with local and regional media, also to inform citizens about plans and intentions and to invite them to join. After Andernach won the Entente Florale for the second time in 2012, also national newspapers and television channels have featured this successful initiative and the project managers and implementers in Andernach like to take credit for the several initiatives that have started to take shape in other cities since then (H. Boomgaarden, personal communication, April 16, 2013).

Generally, people doubted this initiative would be long lasting and having an impact. Especially elderly were sceptical about the success of the project as vegetable plots in public spaces of the inner city reminded them of post-war experiences. However, after initial hesitation to pick food for free, people increasingly dared to take what is available, enthusiasm grew and increasingly, people wanted to become engaged in urban gardening activities. In terms of other goals met, it

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[3] For example, by using no fertiliser, herbicides and pesticides and planting domestic plant species mostly – also to the great enjoyment of domestic animal species.

can be stated that tourism has increased over the past years also due to visitors from other municipalities who would like to learn about experiences made in Andernach first hand (Andernach City Council; Kosak). People's motivations to make use of the free food and become involved range from saving money, to eating healthier and more varied, to educate children about domestic plants, how they grow, taste, etc. The municipality's fear of vandalism has, so far, proven to be unnecessary (Kosak).

Analysis of assumptions and appropriations

For this analysis, the assumptions, appropriations and actions of actors explicitly engaged in transition efforts, i.e. institutional entrepreneurs, are of key concern. The four exemplary cases discussed are each examined in terms of focus, addressed problem, defined goals and employed tools or measures. In a subsequent step, these initial findings are questioned in terms of the notion of the human being underlying the approach and the, thereby, assumed effectiveness of chosen tools and adopted strategies. These reflections are transposed to organising principles that form the undercurrent to assumptions, appropriations and actions encountered.

To ensure analytical breadth, cases have been selected that can be considered archetypal in the sustainable consumption domain, including a labelling programme (i.e. the "Bio-Siegel", organic label), an educational awareness campaign (i.e. the "Zu gut für die Tonne", "Too good for the bin" food waste initiative) and a practical, or "hands-on", educational initiative (i.e. the Ernährungsführerschein; food licence) as well as a project targeting the setting or context of people's workaday life (i.e. Essbare Stadt; Edible City).

The analysis is inspired by the *sensemaking* literature; on the one hand, in terms of its unit of analysis, namely spoken and written narratives offering rationales for chosen strategies, in this context transition efforts, by relating to circumstantial developments, i.e. cues that actors distil and that are perceived as problematic. On the other hand, this analysis subscribes to the notions that sensemaking is social and sentiments need to be shared to result in (collective) action and that sensemaking is enacted which entails that the reality perceived is the reality created.

The following table summarises the preliminary outcomes of the preceding description of the four cases and will be discussed thereafter.

Table 2 Summary table of results based on case analysis

Case(s)	Organic label programme Food waste campaign	Food waste campaign	Food Licence initiative Edible City (EC) project
Focus	Consumption patterns	Consumption levels	Ways of living
Goal	Adaptation of existing practices to include "more sustainable" choices	Adaptation of existing and adoption of new practices to reduce consumption and share with others in need	Letting children or citizens experience the enjoyment of self-prepared, fresh and healthy food EC only: Changes in the city's infrastructure to accommodate new ways of producing and consuming
Defined problems	Lack of awareness about implications of current practices and alternative consumption choices	Lack of knowledge and skills to change unsustainable consumption behaviours	Lack of support (by parents or available infrastructures) to engage in healthier and more sustainable behaviours EC only: Decreased attractiveness of the city for young people and families, long-term unemployment

Tools	Campaigning and information (on product package; through print and online media)	Campaigning and information (print and online; also action days in various cities)	Spaces and places for shared experiences and collaboration
Notion of human being	*Homo eco-economicus*	*Homo economicus moralis*	*Homo creativus*
Organising principle	**Green consumption**	**Sufficiency**	**Collective experimentation**

Case 1: The organic food label initiative – *das Bio-Siegel*

The *organic food label* is based on the assumption that people would like to trust that what is said to be organic food is organic indeed and will choose for the product bearing the label. The key assumption underlying every product label is that provided all necessary and relevant information, people will make the more informed and intelligent decision. The assumption that people are bound to make the better decision given the appropriate information is tied to the notion of the human being as a rational actor. As appropriate, necessary and relevant information is deemed that particular detail which is thought to orient people towards the desired decision, in this case the organic characteristics of the production process. Policymakers, often supported by scientists and stakeholders, decide what the particular piece of information to be provided is – obviously confined by the amount of information that can be displayed on a product and the level of detail that is sensible to communicate at the point of decision-making.

Usually, alerting stickers or labels on products or shelves communicate to people "buy this bargain", with personal profit maximisation (or personal cost minimisation) as the only factor considered to play a role in rational decision-making. However, displaying a label that bespeaks a production method less harmful to the environment and may thereby explain higher purchasing cost involves a broader definition of profit- or utility-maximisation. In addition to money, also public and personal health, environmental protection and animal welfare enter the equation.

The notion of the human being as a rational actor, capable to take all relevant information into account and solely focused on maximum utility has been challenged in economics, psychology and sociology alike. It has, for example, been shown that intentional, motivational factors and perceived control play a role in decision-making (Ajzen, 1991) and that decision-making is based on bounded rationality (Simon, 1991). In addition, practice theories discuss how behaviours relate to social norms and are embedded in systems of provision and institutional contexts (e.g. Shove, Pantzar, & Watson, 2012). To remain in the mathematical analogy, there are hence numerous factors that enter or are excluded from the equation that makes for the outcome of a decision-making process dependant on the kind of choice being made, after careful weighing of available options and potential consequences or not much conscious consideration at all.

We noted above that the use of an eco-label broadens the notion of rationality from purely monetary gains to include environmental and health benefits. In more detail, its use assumes a careful and conscious decision-making process that includes taking note of the label as well as a genuine interest in and concern for the environment that cause the decision-maker to make a positive purchasing decision based on (knowing) what the label denotes. One way to frame the notion of the human being at work when implementing an organic food label is, hence, that of the *homo economicus* yet with ecological concerns, i.e. a *homo eco-economicus*.

Labels are a (common) way for policymakers to engage in transition efforts towards more sustainable ways of living. The Bio-Siegel as an example in the food domain is representative for a number of eco-labels advertise a "more sustainable" product while, at the same time,

frequently justifying its higher purchasing price. From the perspective of the consumer, a label provides sought for information. If the consumer is concerned about health and the environment, and sufficiently solvent, he or she may purchase the product and feel exalted, possibly along the lines of: "I may be paying more, yet, the label tells me I am doing something good". From the perspective of producers and retailers, a label sets inspirational and aspirational standards that are pursued for economic as well as ecologic reasons. A label can, therefore, be conceptualised as an instrument that aims to organise producers, retailers and consumers around a shared view on the importance of high-standard produce that motivates and justifies higher expenditures.

In other words, a label can be viewed as forming part of a cluster of transition efforts that involve the same practices (e.g. growing crops, fruits and vegetables, breeding animals, harvesting and culling, processing and packaging, transporting and selling, buying and consuming) yet now in line with particular, supposedly more sustainable standards that differ from "mainstream" regime standards. These efforts can be viewed as being organised by a principle of "green consumption" that include the same the production-consumption chain, yet somewhat differently[4].

On the part of the consumer, these transition efforts organised by "green consumption" hardly require any changes, especially since most supermarkets in Germany today, offer a broad range of organic products. Ironically, the purchase and consumption of organic products does not really require consumers to go much out of their way, yet it is frequently marketed as a "great deal of difference" to enhance the feel-good factor amongst consumers or to justify expenditures or praise for government interventions. In short, eco-labelling initiatives address consumption patterns and systems of provision rather than consumption levels.

Case 2: The food waste initiative – *Zu gut für die Tonne* (Too good for the bin)

Also in the context of the *food waste* campaign, assumptions of the human being as rational actor with self-interest but also moral motives can be noted. On the one hand, people are being made aware of how much money they are throwing out of the window or, rather, into the bin with every still edible food item they are disposing off and about the detrimental effects this has on the environment. In this respect, the *homo eco-economicus* can again be considered as the underlying notion of what people base their choices on because the "appropriate choice" is rational albeit considerate for social and environmental repercussions.

In the context of this initiative, food waste is defined as the problem to be addressed and the set target is to half the disposal of all edible food waste by 2020, in reference to the European Commission's Roadmap to a Resource Efficient Europe (2011). Since the BMELV food waste initiative is composed of several informative, institutional and infrastructural instruments, a number of assumptions regarding the different instruments and their effects need differentiation. The deployment of media awareness campaigns and action days assume that temporary information provision about monetary and environmental costs involved will entail long-lasting behaviour change countering food waste. The assumption underlying the website and app is that continuously available information (e.g. a database with leftover recipes) will continuously help to counter the problem defined. Furthermore, the endorsement of doggy bags in restaurants and the possibility to order varied portion sizes targets social norms and institutions.

In comparison to the previous initiative on organic food that did not involve any significant change in habits aside from picking the products bearing an organic label from supermarket shelves, this initiative on food waste asks people to do quite a number of things rather

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4   This formulation is not intending to belittle all the work, changes and investments that have to go into converting a conventional into an organic farm. For the sake of the argument, however, it needs to be clear that "in principle" many norms and ways of doing things remain untouched albeit becoming aligned with a particular set of standards.

differently. On the one hand, the campaign openly addresses the issue that buying more than needed is "bad", for the wallet and for the environment. Yet, in case one has bought too much (in particular retailers and restaurants) and cannot consume or sell it all, there should be regard for others and Christian, if not human values require sharing the superfluous with those who have little. Hence, on the other hand, there is an appeal to people's conscience by raising awareness for others in society who can hardly cater for their own subsistence and who should be supported and shared with.

The use of moral arguments and the cooperation with churches alludes to a slightly different notion of the human being than the one that makes rational choices based on a broad set of factors, including environmental. Within the moral appeal lies the assumption (or hope) that people's altruistic regard for others and their needs enters the equation and tips its outcome towards more sustainable behaviours. The notion of the human being underpinning this assumption can be framed as a *homo moralis* who avoids wasteful behaviours based on the concern for others' needs. In addition to consumption patterns, this initiative also addresses household consumption levels by educating about appropriate ways to plan grocery shopping, finishing left-overs and still edible products beyond the expiration date as well as passing on what oneself will not use to others in need.

The analytical gaze, therefore, reveals two principles that underlie these efforts towards more sustainable consumption. Similarly to the previous case, a "principle of green consumption" is at work which frames and gives meaning to slight, presumably more sustainable variations of current practices, e.g. making better use of left-overs or only throwing away products that have actually gone off and not just passed the expiration date. In contrast, a "principle of sufficiency" underlies the replacement of old ways of doing things by different ones that involve reduction and abstinence, e.g. better planning and only buying what is needed or donating to others in need. However, people are not explicitly asked to restrain themselves, possibly because policy does not want to appear to dictate "appropriate behaviours" or because otherwise retail and restaurants may not have become engaged. Instead, people are asked to consume carefully and share what is too much with others who have too little.

Regarding the declared goal (i.e. halving food waste) and the selected instruments (i.e. website, app, action days, campaigns through print media) both principles, green consumption and sufficiency work in parallel and complementarily[5]. The stakeholder alliances formed and the measures taken to educate about, motivate and support different practices regarding food purchase, handling and consumption are the same for each principle. Since the reduction of food waste is a comprehensive goal that relates to a number of interrelated practices, involves a considerable amount of knowledge and skills and relies on systems of provision, some of which clearly favour wasteful consumption, a myriad of changes is needed to make any progress towards the desired goal at all. Therefore, it may come as no surprise that different approaches and arguments are used that are based on a couple of different notions of human beings, framed and made meaningful by a couple of principles.

Case 3: The Food Licence for children – *der aid-Ernährungsführerschein*

In the context of the *food licence* initiative, the assumed view on human nature and what motivates more sustainable behaviours is different than that of the two initiatives discussed above, possibly because it targets children. Instead of providing information to be passively absorbed, the food licence aims at attitude and behaviour change through playful, experiential and experimental learning and practicing. During the sessions, children are encouraged to try out new practices, under the supervision of teachers, parents or nutrition experts, of course. The primary goal is that children feel comfortable to explore and follow their intuition with no more

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[5] There may, nevertheless, be numerous other, possibly more effective ways to support changes for food waste reduction, some of which were also proposed in the study carried out at the behest of the BMELV in the aftermath of the Taste the Waste movie (Kranert, et al., 2012).

guidance than asked for. The approach and the didactical material facilitate self-dependent testing and learning and hope to motivate lasting behaviour change. Encouragingly, although some effects have been found to dwindle after a few weeks with candy re-appearing in lunch boxes (B. Kaiser, personal communication, Sept 11, 2013), long-term effects in the form of knowledge and behaviours have been established ([Sommer, et al., 2011](#)).

The notion of human experience and behaviour underlying this initiative can be conceptualised as a *homo creativus* who follows own ideas and intuitions whilst applying knowledge (what is healthy), norms (what is appropriate behaviour), skills (how it is practically done) and rules (recipes). It acknowledges the usefulness of playful experimentation in addition to the acquisition of skills and knowledge. The centrality of creativity and self-determined experimentation is shared by all groups of stakeholders who become involved financially or in kind and who help implementing and further developing this initiative. This may not be the case initially, though, as teachers, parents and nutrition experts supervising the classroom activities need to be explicitly cautioned and repeatedly reminded that the didactical core idea is "as little interference and guidance as possible" (B. Kaiser, personal communication, Sept 11, 2013).

The particular strategies chosen and instruments developed for this initiative only make sense and become meaningful based on the assumed *homo creativus*. Given that children are encouraged to experiment with new knowledge, skills and practices in groups albeit self-determined and that all adults do not interfere unless they might otherwise be accused of "non-assistance of a person on danger", the principle that organises and shapes this initiative or these transition efforts can be described as a "principle of collective experimentation". Surely, the experimentation is goal-directed, with the goals having been defined by others, not the children themselves, and it is restricted by time and material constraints, e.g. in terms of the school curriculum and equipment provided by the school or supplied by parents. However, within these boundaries, children are free, encouraged even, to find and develop their own ways of doing things.

By the same token, teachers, parents and experts also form part of this collective experimentation. Teachers have rarely done anything similar in class before carrying out the series of practical workshops the food licence consists of for the first time. The experts have and still are specifically trained by the aid, the developer and manager of the initiative, to be able to support the didactical format of self-directed learning appropriately. Parents are usually asked to help prepare and occasionally also assist the in-class activities and have reportedly been surprised by the children's subsequent and persistent interest in helping with groceries shopping, preparation of dishes with fresh ingredients and instilled hunger to continuously get better at that ([Sommer, et al., 2011](#)).

Case 4: Public urban gardening – *die Essbare Stadt* (The edible city)

The *urban gardening* initiative in the city of Andernach is directed at a broad range of problems its developers identified, including tight public budgets, long-term unemployment, keeping the city attractive to young people and families, decreasing external recognition and interest (e.g. declining tourist numbers) as well as dwindling knowledge about gardening, domestic species and healthy and fresh food among the city's inhabitants. Furthermore, the conceivers of the urban gardening initiative considered it a pity that citizens did not view public space to be owned by and available to them but rather to be "private" property of the municipality.

The instruments chosen to address these problems are a different spending of the available green keeping budgets, namely to grow food in suitable public areas that previously featured lawns or flower beds, the employment of long-term unemployed for maintenance and the continuous invitation to citizens, e.g. through newspapers and local radio, to pick free food and become involved. After a while, demand by local citizens and interested external parties triggered the development of courses and workshops addressing native plant species and urban gardening practices which were subsequently added to the set of instruments. Therefore, the

success in terms of inspiring, engaging and involving citizens can also be read off from the inquisitiveness triggered. Courses and workshops were developed because people wanted to learn about urban gardening and to help strengthen or reintroduce domestic species.

In comparison to the three cases analysed above, the public gardening initiative stands out by deliberately not educating and informing people about what they should do better or differently, unless they ask. Instead, the city environment was changed into one that "demonstrates" and "talks about" healthy and sustainable food and "invites" participation rather than an environment that "demands". Based on this and coming back to the central concern of this analysis, the *homo creativus* can again be noted as the underlying notion of the human being. The fact that all project developments cascaded from the "simple" decision to invest public money slightly differently, i.e. to grow edible plants in some areas of the city and, hence, make a change to people's environment, supports the conclusion that the underlying notion of the human being as a playful, creative animal is a successful one in striving for support and engagement. People even ask for more knowledge, tools and skills and sign up for courses. This enthusiasm and involvement bespeaks a desire for being inspired to take individual and collective action.

In comparison to the food licence case, the recognition of the creative streak of people and their desire to experience and experiment are even more strongly pronounced here as not only participants at the receiving end are invited to engage creatively, but also the developers and implementers of the initiative themselves. There is no set-in-stone plan yet and every step taken in project implementation provides insights and ideas for the ensuing one. In other words, a "principle of collective experimentation" appears to be at work.

These observations offer fertile ground for reflections on the role and functioning of organising principles. It is frequently supposed that powerful visions can provide inspiration and guidance towards desired goals. This assumption may explain the plethora of visions, roadmaps and strategies which forms part of current transition efforts in the business, research policy as well as the civil society domain (Backhaus, Breukers, Mont, Paukovic, & Mourik, 2011). However, in the case of Andernach, no uniform vision existed, solely a number of ideas, including a rather radical one related to the purpose of public expenditure, that are bit-by-bit brought to life and amidst their implementation cause new plans and ideas to sprout.

Discussion

Transition efforts seek to accomplish fundamental changes in practices which are deviations from usual patterns and habits. In four case studies we tried to delineate the assumptions about what is at stake in such deviations and what strategies can foster the desired change. We labelled such assumptions organising principles, and we found that they are often present as more or less coherent narratives, which are shared and can be referred to as a resource.

In the four case studies, we encountered different versions of three underlying narratives. The first narrative involves notions of the rational human being that also has an environmental conscience and therefore takes decisions that (are assumed to) benefit people, planet, and profit. This *homo eco-economicus* can be viewed as forming part of a paradigm of *green consumption* which suggests that consumption can continue as previously as long as we switch to more sustainable products. The second narrative revolves around *sufficiency* ideas and asks people to consume as they please yet not take more than they need. In this case, the *homo economicus moralis* can be considered the central notion, i.e. a person who acts rationally and follows own interests yet also cares about the subsistence and well-being of others. Lastly, we noted a narrative that conceptualises the human being as a curious and experiential animal, which we termed the *homo creativus*, who likes to engage in *collective experimentation* to explore ways of living, working and interacting to find out what suits oneself and others best.

In each case, the underlying paradigm or principle was shaped by the actors involved in the initiative and the instruments chosen, and – vice versa – played a role in decisions related to the

actors invited for engagement and the selected instruments. In other words, structuration processes occurred that echo Weick's ([1995](#)) notion of enactment in organising processes based on the idea that interpretations that draw on paradigms or framings shape actions taken. At the same time, these processes remind us of the duality of structure because nothing was predetermined and every actor involved has, and often makes use of the opportunity to mould the initiative to particular interests, i.e. to exploit the potential of embedded agency ([Mutch, 2007](#)).

In every case study, institutional entrepreneurs could be observed in the social construction of identity, in making sense of and finding legitimacy through past events (retrospective), in continuously extracting or actively creating cues to make sure the planned initiative pleases financers, suits the target group and meets its goals. Notably, however, not every actor presents plausible stories about how the planned measures address defined problems and help attaining project targets. For example, the food waste campaign discusses at length how many people acknowledge the problem and have heard about the initiative but not in how far progress has been made towards the target to half food waste by 2020. Regarding another case, developers of the food licence declare that sustainable consumption is not their primary concern but that they aim at developing lasting knowledge, skills and motivation among children to eat fresher and more varied food, argue how and why their approach helps in achieving this goal and explain how the materials developed underwent rigorous testing (B. Kaiser, personal communication, Sept 11, 2013). In the case of the urban gardening initiative, the developers admit that that they have exceeded their targets and expectations (H. Boomgaarden, personal communication, April 17, 2013) and jury members confess that they were reluctant to reward the city of Andernach with yet another prize (F. Lohrberg, personal communication, Sept 18, 2013).

There lies a danger in neglecting assumptions about the effectiveness and efficiency of transition efforts. If underlying assumptions remain unacknowledged and, therefore, not investigated there is not only the threat of a given initiative failing but the challenge that every initiative creates ideas and expectations amongst recipients or participants about "appropriate and suitable" measures to address a defined problem, i.e. about the pathway to follow. This is of particular danger given that unacknowledged assumptions, including those known to be faulty, are frequently strategically appropriated by actors with the interest to maintain the status quo. For instance, industry happily succumbs to the *organising principle of green consumption*, which closely resembles the by Holt fiercely criticised *ethical values paradigm* ([2012](#)), since this implies that any effort made at strengthening environmental values through information and campaigning shows concern and engagement on the side of the campaigner but is likely to be in vain as the relation between abstract values and actual consumption patterns has been shown to be mild, at the most.

Conclusions

The number of sustainable consumption initiatives is large already and growing still. This paper analysed four exemplary cases in the domain of more sustainable food consumption in Germany and found that each initiative is structured by a particular principle or paradigm. The four cases scrutinised were inspired by a principle of *green consumption*, *sufficiency* or *collective experimentation*. Such organising principles, on the one hand, provide rationales for the problem addressed, the choice of participants and the measures taken. On the other hand, they are actively constructed and maintained by the actors involved. These findings resonate with and draw on organisational studies and, more specifically, the sensemaking literature.

This study of narratives draws attention to the workings of organising principles as paradigms that allow for collective sensemaking and hence action. In addition, this analysis points to the, often hidden, implications of unacknowledged assumptions about the effectiveness and efficiency of sustainable consumption initiatives and their strategic appropriation by particular actors.

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Innovative value creation models for sustainable living

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Along with product and process innovation, we urgently need to make fundamental changes to business models – and the systems that support them – to meet our current and future sustainability challenges.
                                                    Ryan Whisnant, SustaiAbility

Abstract

Current production and consumption are unsustainable. Traditional business models do not fully account for ecosystem services and social costs. Innovative value creation models (IVMs) that take into consideration environmental costs and social goals in addition to financial profit in which new modes of production, consumption and value creation are devised by new set of actors are needed. IVMs have not been researched systematically. This paper aims to 1) showcase IVMs supporting sustainable living; 2) discuss their environmental implications and role in fostering sustainability transitions. Theories applied are business model and social innovation, and socio-technical transitions. Case study approach is used to analyse IVMs in four consumption sectors: energy and housing, food and drink, mobility and consumer goods. Data is collected via meta-analysis of peer-reviewed articles, books, conference proceedings, reports and policies in online data bases. Data is analysed via in-depth case analysis of IVMs in four sectors, and cross-case comparison between the sectors. The paper discusses actor-network and institutional dynamics in IVMs and their environmental implications. It identifies patterns in the development of IVMs: shifts in producer-consumer dynamics, which have implications for resource flows in the society, and IVMs' potential to reduce environmental impacts. It highlights the importance of ICT in IVMs' proliferation and acknowledges the risk of rebound effects stemming from wicked problems associated with IVM implementation. Future research needs to focus on development of IVM classification, delineation of mechanisms and pathways to scale up the promising IVMs and the development of a sound methodology to measure environmental, social and economic effects of IVMs.

Introduction

Current patterns of production and consumption are unsustainable. Consumption levels have increased six-fold since 1960s (Backhaus et al. 2012). Consumption of food, drink, transport and housing accounts for 70% of environmental impacts in Europe and contributes to major greenhouse gas (GHG) emissions (EEA 2013). Technical innovations alone have proven to be insufficient to solve the pressing problems of today (Johansson, Kisch, and Mirata 2004; Mont et al. 2012; Backhaus et al. 2012). Therefore non-technical innovation is also required to enable transitions to green economy[1] and more sustainable living (Steward 2012; Witkamp, Raven, and Royakkers 2011). Responding to this EU 20/20/20 policy encourages innovations to involve producers, consumers and diverse social actors - 'public authorities, economic operators and citizens alike' (EC 2008).

Traditional business models create value and generate profit via volume sales and often do not fully account for ecosystem services and social costs. There is a fundamental need for innovative approaches for creating, delivering and capturing value to ensure more sustainable living (GlobeScan and SustainAbility 2013). Sustainability transitions cannot be solely supported by traditional business models, but should include development of *innovative value creation models*

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[1] Green economy – economy that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities (UNEP 2011, 2011)

(IVMs) in which new modes of production, consumption and value creation are devised by companies, public actors and individuals. IVMs focus on the environment, well-being and quality of life in addition to financial profit. IVMs are broadly defined as novel forms of exchange at some point along the company's value chain that enable a business to respect environmental limits while fulfilling social wants and needs (Clinton 2013). Examples include neighbourhood biomass heating, community supported agriculture, car sharing, redistribution markets for clothes etc.

Despite the fact that IVMs emerge in different sectors and can deliver sustainability benefits, IVM phenomenon has not been researched systematically. Particularly the ways in which IVMs influence consumption patterns and lifestyles have not been sufficiently addressed. In addition while business model innovation represents a common and frequently occurring global phenomenon, examples of IVMs advancing a sustainability agenda are more rare and difficult to discover.

Therefore this paper aims to contribute to knowledge in two ways:

1) to showcase good practices of innovative value creation models that support sustainable living;

2) to discuss their environmental implications and potential role in fostering sustainability transitions.

Case study research is used to analyse IVM examples in four consumption sectors: energy and housing, food and drink, mobility and consumer goods. These sectors are selected for analysis as they lead to the most significant environmental impacts from households in Europe (EEA 2013); demonstrate unsustainable trends in terms of environmental pressures; and provide ample empirical evidence of diverse IVMs in each sector.

Case study research is selected among other methodological approaches since it is preferred for thorough examination of causal paths (George and Bennett 2005), when the investigator has little control over events, and when the focus is on a contemporary phenomenon (e.g. IVMs) within real-life context (e.g. four consumption sectors) (Yin 1994). It will help explore conditions under which specified outcomes occur (e.g. IVMs reduce consumption levels or change consumption patterns), mechanisms via which they occur (e.g. mechanisms to shape more sustainable lifestyles), rather than uncovering the frequency with which they arise (George and Bennett 2005).

Data is collected via meta-analysis of peer-reviewed articles, books, conference proceedings, reports and policies in online databases (LUBSearch, ProQuest, EBSCO, SSRN) and in-depth interviews with actors involved in selected IVMs. Major themes for data collection include green business models, business model innovation, social innovation, distributed economies, collaborative consumption, and sustainability transitions.

Data is analysed via 1) in-case analysis of IVM examples in four sectors; 2) cross-case analysis and comparison between the sectors. The framework, which ensures a consistent analysis of data and cross-case comparison of different IVMs, includes key elements of innovation systems: *actors*, their *networks*, and *institutions* (Malerba 2005; Carlsson and Stankiewicz 1991; Bergek et al. 2008). While the role of *technology and infrastructure* in the success of IVMs is highlighted, it is not of a primary focus for the analysis in this paper as IVMs mainly represent non-technical innovative solutions. At the same time, the role of *markets* is deemed crucial to take up in the analysis and discussion since market relations have implications for resource flows and environmental impacts of IVMs. In addition to the analysis of these elements, the implications of IVMs for the environment and their role in transitions to more sustainable lifestyles are discussed.

The paper is structured as follows. This section introduced a research problem, outlined main knowledge gaps, and presented the aim and methodological approach of the paper. Section 2 discusses theoretical underpinnings guiding the research and reviews documented empirical

evidence of IVMs. Section 3 presents IVM case studies in four consumption sectors including energy and housing, food and drink, mobility and consumer goods. These are analysed and compared in Section 4, which also discusses the potential of selected IVM examples to deliver environmental and social benefits, and contribute to sustainability transitions. Section 6 provides conclusions and outlines areas for future research.

State-of-the-art

Relevant theories

Theoretical schools of thought informing this research on IVMs include innovation systems studies (primarily business model and social innovations) and socio-technical transitions.

A broader field of *innovation system* studies incorporates "all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations" (Edquist 2004). Innovation systems approach is applied at various scales (from technology-specific to national) (Hannon 2012; Carlsson and Stankiewicz 1991) and to technical and non-technical innovations. Particularly relevant are 'system innovations' (Steward 2012), which include multiple technical and non-technical solutions and a mix of societal actors. Such innovations are argued to enable fundamental change in the way people think about production and consumption and reconfigure established routines.

Business model innovation is a development of a novel set of activities for value creation and capture (Chesbrough 2010). Research exists on what constitutes a business model (Osterwalder and Pigneur 2010; Zott and Amit 2010) and how and why novel business models emerge and challenge existing ones (Teece 2010; Johnson, Christensen, and Kagermann 2008). Particularly relevant are studies on green business models (Stubbs and Cocklin 2008; Bisgaard, Henriksen, i Bjerre 2012; Boons and Lüdeke-Freund 2012), which support the development of products and services with reduced environmental impacts and that are economically viable. However, very little research exists to address alternative ways of organizing production and consumption by engaging actors other than traditional business players, i.e. IVMs.

Social innovation is an emerging field of practice and research that does analyze value models provided by actors other than traditional businesses. Social innovation includes new ways of satisfying social needs (through products, services, models) by creating new collaborations among societal actors (Murray, Gaulier-Grice, and Mulgan 2010). Social entrepreneurs find alternative ways to use under-utilized resources for the benefit of society. They create a "third sector" between private and public sectors (Shaw and Carter 2007) and are often the actors engaged in IVMs. Social and business model innovation literature will inform this research on IVMs' potential to connect business with social entrepreneurs and their value models.

Theoretical school of thought on *socio-technical transitions* (Rip and Kemp 1998; Geels 2002; Geels and Schot 2007; Geels 2011) combines concepts from evolutionary economics, science and technology studies, structuration and neo-institutional theories (Geels 2011). Socio-technical transitions literature explains how and why the transitions occur and highlights interconnectedness between social and technical elements. Empirical examples include sustainability transitions in mobility (Köhler et al. 2009; Nykvist and Whitmarsh 2008), urban development (Hodson and Marvin 2010), organic food (Seyfang and Smith 2007), housing (Seyfang and Smith 2007) and energy sectors (Geels and Raven 2006; Hannon 2012). This literature provides theoretical insights on interactions between IVMs, established business models and policy arrangements, and pathways for niche innovations to scale up. The literature is, however, in its formative phase and has been criticized for the difficulty of empirical application, lack of attention paid to the role of innovative business models in socio-technical transitions and the main focus on technical and macro-level innovations (Hannon 2012).

At the same time, some studies (Malerba 2005; Mont and Emtairah 2008) have outlined several types of emerging forms of transformation and coordination in business models including: 1) the role boundaries of actors in the system relative to conventional practices change; 2) institutions involved in the interactions and coordination of value provision change and/or co-evolution; and 3) technologies and physical and knowledge infrastructure that shape and are shaped by the emergent value creation models. Changes in the market relations also have implications for resource flows and environmental impacts of IVMs as compared to traditional business models. In addition, innovating firms need to be able to see and adapt to shifting market and other conditions by identifying trends and engaging stakeholders (Whisnant 2013).

By exploring the IVM cases with an attempt to merge business and social innovation studies with research on socio-technical transitions, this paper seeks to fill some of the aforementioned gaps in these two theoretical schools of thought. In particular, the analysis of transformations in market relations will help better understand the nature and extent of the change in the system elements, such as the roles of actors, their networks and strategies they pursue, physical re-arrangements, and institutional changes, as well as environmental implications of such changes.

Empirical evidence on innovative value creation models in literature

Empirical evidence on the emergence of IVMs and their potential to deliver economic, environmental and social benefits exists in sustainability studies. The first strand of studies is on *collaborative consumption* (Botsman and Rogers 2011; Seyfang 2009), where IVMs occur within its 3 systems: digital sharing, product service systems (PSS), and redistribution markets and collaborative lifestyles (e.g. car or bicycle sharing, swapping or reselling clothes, tools exchange or land sharing). The second strand of studies includes *distributed economies* (Johansson, Kisch, and Mirata 2004; MESPOM 2009): instances when consumers become co-producers and/or suppliers of energy (e.g. biomass neighbourhood heating in Nordic countries, community based wind electricity production) (MESPOM 2009; Voytenko and Peck 2012) or food (e.g. community supported agriculture, urban agriculture) (MESPOM 2009; Seyfang 2006). IVMs engage new actors on the markets (e.g. social entrepreneurs, municipalities, living labs etc.) and create new value chains. Driven by a different set of priorities compared to traditional businesses, IVMs promote sustainable business, innovative products and services and enable sustainable behaviour of consumers, as well as ensure accessibility and affordability of products and services for all socio-economic groups (Mont et al. 2012).

Although there is no established IVM definition, there is a list of their key features mentioned in several studies (Mont et al. 2012; SPREAD 2012; Hicks, Groezinger, and Thorne 2012):

- o create, capture and deliver value by selling function / utility of a product (not product per se);
- o include environment, well-being and quality of life in addition to economic values and financial profit;
- o involve actors from public (e.g. social entrepreneurs, municipalities, NGOs, research institutes, living labs etc.) and private (e.g. companies, business hubs etc.) sectors;
- o mix profit and non-profit, individual and collective activities;
- o represent business-to-business (B2B), business-to-consumer (B2C), consumer-to-business (C2B) or consumer-to-consumer (C2C) market relations;
- o may contribute to the establishment of new sustainable markets;
- o intend to support individuals in making more sustainable lifestyle choices;
- o often represent decentralized production units.

Despite empirical evidence of emerging IVMs and their potential to deliver sustainability benefits, IVM phenomenon has not been researched systematically. Although studies on

business models, social innovation and socio-technical transitions provide valuable insights to the understanding of IVM concept, neither of these strands has explicitly addressed the role such models play in a transition to more sustainable living. This paper seeks to open a new research agenda, which will be able to fill in the aforementioned knowledge gaps.

Case studies

IVM examples discussed in this paper represent different market relations, originate from various geographical and institutional contexts, and fall within four sectors with the most significant environmental impacts in Europe including energy and housing, food and drink, mobility and consumer goods.

Energy and housing

Many regions in Europe that used to generate heat and electricity from centralized oil, coal and nuclear power shift to biofuels, wind and solar energy (Voytenko and Peck 2012; MESPOM 2009). This leads to decentralization of energy production and supply, bringing it closer to end-users and thus reducing waste generation and carbon-intensity. Such energy systems engage new actors (farm based entrepreneurs, rural cooperatives, municipalities etc.) and contribute to local development via rural diversification and job creation.

One type of IVM envisions co-production of value with active involvement of consumers or clients in energy generation and supply. In this model, individuals in addition to being consumers start playing an active role in a co-production of utility, e.g. households become co-producers and consumers of district heat (Voytenko and Peck 2012) or electricity (Southerton, Chappels, and Van Vliet 2004). The service and value is thus produced in a close contact with or by the actual user. Examples of this IVM are presented below.

Co-production of electricity, Samsø island, Denmark

Electricity distribution on Samsø island (Denmark) is managed by a cooperatively owned local utility. Electricity is supplied by 11 land-based and 10 offshore wind turbines. Nine land-based turbines are owned by local farmers, while the other two – by local cooperatives. The municipality of Samsø invested in five offshore turbines, three are owned by small local businesses and two belong to cooperatives comprising of local residents and non-islanders who have some relation to Samsø. Electricity demand of 4000 island inhabitants is fully met by the land-based turbines. The offshore wind park generates 10% surplus that is exported to the mainland. A small share of electricity is also generated from private installations of solar PVs. The Samsø Energy Academy has 100 m² of PV panels integrated on the roof (MESPOM 2009).

Co-production of district heating and hot water, Horbelev, Denmark

A farmers' cooperative in the village of Horbelev (Denmark) owns a 1.6 MW straw-fired plant that supplies district heating and hot water to 205 homes. This initiative was steered by a group of citizens in Horbelev who saw a need to substitute expensive oil and electricity heating in the village with locally sourced biomass. Horbelev municipality acted as a warrantor on the bank loan and an owner of the distribution network. Each citizen pays an annual fee for the service and saves up to 1000 EUR per year on heating. Climate and energy security benefits are achieved by substituting fossil fuels with locally sourced straw fuel (Voytenko 2012).

Food and drink

In many instances across Europe a transformation to more sustainable agriculture via distributed local farming has taken place (MESPOM 2009). As in the energy case, such initiatives engage new actors (farm-based entrepreneurs, farmer cooperatives, urban farmers etc.), who are food co-producers and suppliers. They are located closer to consumers, often rely on

methods of organic or integrated pest management farming and thus deliver environmental and social value locally and regionally. Examples of IVMs that envision organic food delivery from a farm directly to consumers are provided below.

Organic food supply to consumers, A@rstiderne, Denmark

A@rstiderne is a Danish Internet-based company delivering a wide variety of organic food (fruits, bread, meat, fish, nuts, wine etc.) from its own farms in weekly wooden returnable boxes directly to more than 35 000 households in Denmark and Sweden. The company employs 110 people and has an established co-operation with other organic growers and farms. A@rstiderne supplies the products via subscription schemes. Its strategy is to deliver first class organic food and provide convenience, storytelling and simple recipes. The company aims to raise awareness on sustainability, food quality, energy savings and fair and ethical trade (Aarstiderne 2013).

Organic food supply to consumers, Mossagården, Sweden

Mossagården is a family owned business, which cultivates organic vegetables and delivers about 900 boxes with organic food per week to consumers in Scania region (Southern Sweden) by vehicles on biogas or bicycles. The paper delivery box is recycled through a payback system. The company has long-term contracts with municipalities, private actors and schools. It has also established cooperation with other companies in Scania, Italy, the Netherlands, Ecuador and Spain to ensure organic food supply in a low season. In 2008 Mossagården was awarded regional environmental award for its commitment to the cultivation of organic food and information spreading about organically grown vegetables (Mossagården 2013).

Mobility

New modes of personal mobility such as car sharing and pooling in addition to public transportation, cycling and walking have a potential to reduce negative environmental impacts from the transportation while delivering similar to the private car function. Another concept that is being developed in many cities includes integrated mobility services. The seamless transport systems are often enabled by the use of information and communication technologies (ICTs).

Ride-sharing services are found across the globe (ZipCar, goCarShare, GoGet, Liftshare, Connect by Hertz, Lunds Bilpool etc.). In 2016, about 10 million car-sharing members are expected in North America, Europe and Japan (Mont et al. 2012). Advantages for car sharing include cost savings for users, convenience and guaranteed parking opportunities.

Integrated Mobility Apps (IMAs) are an example of ICTs embedded into "smartphones" that make seamless mobility systems customer-friendly. IMAs allow individuals to access information about various mobility options and efficiently link several modes of transport into a customised solution. In terms of a business model, integrated mobility systems are provided by different public and private actors who all contribute with parts of the total offer. IMAs often provide integrated payment methods through one channel and linked to one account.

Examples of IVMs supporting more sustainable ways of moving are provided below.

Integrated mobility app by Daimler, Germany

The mobility platform Moovel is a pilot project launched by Daimler in 2012 in Stuttgart. It links integrated mobility system to the optimisation of resources. Moovel's users can optimise their mobility routes by comparing different mobility modes, identifying best connections between the modes, choosing suitable times and comfort levels, and the best price. Moovel has a built-in function that identifies ride-sharing possibilities for specific routes. It can help order a taxi or use vehicles from car-sharing services. According to Daimler (2013), over 50% of ride-sharing bookings were for distances of less than 10 km.

Car sharing scheme Lunds Bilpool, Sweden

Lunds Bilpool is a Swedish non-profit car sharing cooperative which is run by individuals on a voluntary basis. It owns 11 cars of various models and has about 230 members. The annual fee for those actively involved in the working groups of the cooperative is EUR 100 and EUR 200 for all other members. The price for renting a car includes costs for fuel, insurance, tax, services and repairs. The cooperative is a self-governed organisation coordinated by the Board and managed through the working groups (Lunds bilpool 2013).

Bicycle sharing scheme Vélib', France

Vélib' is a public bike-sharing system in Paris. A bike can be hired either at one of Vélib' stations or online, and then returned to any Vélib' station. A one day ticket costs EUR 1.70 while long-term annual subscriptions cost EUR 30-40. The first 30 minutes of each trip are free of charge. To keep the bicycles in appropriate condition service teams regularly check them at the stations and repair the broken ones. Vélib' seeks to reduce car use and encourage healthy lifestyles by promoting physical exercise through biking. The system is funded by the JCDecaux advertising company in return to that the city of Paris places advertising boards on its streets (Vélib' 2013).

Consumer goods

Many products are designed with unjustifiably short life spans, which leads to a throwaway society characterised by growing volumes of waste, increased resource use and environmental pollution linked to production and disposal (Cooper 2010). IVMs have emerged in the consumer goods sector with an aim to reduce environmental impacts from unwanted or obsolete goods by prolonging their lifespan using different strategies.

Promising IVMs in this respect include 1) re-distribution markets with products swapping, reselling or donating either through business-to-consumer (B2C) models (e.g. eBay, second-hand stores etc.) or via micro-transactions in a consumer-to-consumer (C2C) non-profit network (e.g. flee markets, Freecycle.org etc.); 2) extension of a product lifespan through repair (Repairnetwork Vienna) (Mont et al. 2012); 3) upcycling of used materials or products to create new goods of a better quality and thus contributing to more efficient product end-of-life and reduced resource use (e.g. Patagonia, Royal Robbins, Worn Again, Relevé Design etc.); and 4) actively engaging consumers in the design of the products they will use via so called "user-driven innovation"[2]. The later IVM increases a chance that the product will be used for a longer time, will be appreciated and well taken care since the customers participated in its design and adjusted it to their specific needs.

Real life examples of IVMs in the consumer goods sector are briefly described below.

User-driven innovation for customised sneakers by Nike

As it is sometimes difficult to find perfect sport shoes, many of the largest sneaker manufacturers including Nike, Puma and Keds initiated a service offering a customisation opportunity to consumers online. The consumers get a possibility to choose the size, arch support and different types of soles suitable for their feet and preferred types of running, colour and a graphic they desire. After these choices have been made, the shoes are produced and sent to the consumer (Nike 2013).

Second-hand market Blocket, Sweden

Blocket is a Swedish second-hand market similar to Amazon or eBay. It is a private company that started in 1996 and which employs 57 people. It is the largest national retail marker with 4 million people visiting its webpage daily. Individuals and businesses advertise used and new

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[2] User-driven innovation or design implies an active involvement of consumers in the design phase of a product or service

products via blocket.se, which creates revenue by charging a fee for each advertisement. This IVM embraces mainly C2C market relations but aims to increase B2C sales of new products. In 2013 Blocket estimated that its sales of second-hand goods in 2012 contributed to savings of 1.6 million tonnes of GHG (Blocket.se 2013b). These results were communicated to Swedish people together with suggested strategies on how they can further reduce their environmental impacts. Blocket also sponsors collaborative consumption initiative Retoy (Blocket.se 2013a).

Clothes library Lånegarderoben, Sweden

Lånegarderoben is a non-profit clothes library in a suburb of Stockholm. Its customers pay a membership fee of EUR 70 per half a year or EUR 17 per month in return for a possibility to borrow a maximum of three garments every three weeks and keep them during this time. Clothes are supposed to be returned clean, and laundry advises are provided. Available collection includes 800 vintage, second hand and new garments, both male and female, which are donated by Swedish designers. There are up to 200 active members. Since all the work is done on a voluntary basis, the library is only opened once per week and one weekend per month (Lånegarderoben 2013).

Analysis and discussion

In this section the potential role of IVMs in enabling and fostering sustainability transitions is analysed by focusing on the dynamics and transformations in the main elements of innovation systems including actors and their networks, and the broader institutional context.

It is generally accepted that innovations do not only happen at organisational level, but are often associated with, driven by or themselves trigger changes in other organisations and in broader socio-technical and institutional environments in spatial and sectorial contexts (Asheim and Gertler 2004). Therefore, the innovation systems approach often enables more structured discussion on the factors that typically influence the development, diffusion and use of innovations. Innovation studies recognise the importance of several critical elements in innovation processes, such as actors, interactions among them, technology and institutions (c.f. Malerba 2005; Carlsson and Stankiewicz 1991; Bergek et al. 2008). These elements are often conceptualised into a framework to describe activities that enable, facilitate or hamper innovation processes (Edquist 2005).

Thus the innovation dynamics results from the interaction and co-evolution between different elements, e.g. technology, knowledge and learning, demand, business and other types of organisations and institutions (Malerba 2005). Business models innovation also to a large extent builds on the co-evolution of similar elements. One of the often-omitted parameters in the evaluation of business models, however, is the direction of innovation. Typically, the emphasis is placed on the rate of innovation, rather than the direction of innovation processes (Edquist 2005). In the context of the sustainability discussion, the direction of innovation processes becomes both directional and normative, as we would like to see changes in existing production-consumption systems towards greater environmental, social and economic sustainability. Therefore, this paper seeks to investigate the sustainability of IVMs and how they evolve and interact in the broader socio-technical and institutional contexts. Below factors that trigger and shape system level changes are identified and analysed with specific focus on the nature and dynamics of transformation in production and consumption patterns.

Actor-network dynamics

Several dynamic mechanisms can be observed within presented IVMs cases. In some of them, there is *a shift* from traditional business models based on offering material goods and products to consumers to satisfy their needs towards either *product-service combinations* with the main idea to create value through access to product use (e.g. car- or bike-sharing) *or integrated systems* where consumer needs are satisfied through a comprehensive package of products and

services and infrastructural systems (e.g. integrated mobility systems). These shifts in the way consumer needs are satisfied obviously have implications for relationships between the actors engaged in the system of provision, as well as for the system of provision itself.

Often *new actors* become part of the system, while incumbent companies are often faced with a difficult choice of being threatened by constellations of newcomers. In the case of car sharing, for example, car manufacturers seldom feel compelled to enter the car sharing market as they feel this would undermine their business case of profit generation through producing cars. In a way, the newcomers see themselves as players in the market of mobility, while car manufacturers act on the market of producing cars. However, car manufacturers make more profit from after-sales support and repair business, making planned obsolescence a successful strategy. The average lifetime of cars reduced from 25-30 years in mid-1960s to less than 10 years in present times, indicating clearly the trend among car manufacturers towards shorter lifespan of cars. On the other hand, provision of mobility through alternative means is gaining ground, especially among younger generation - some even talk about car ownership peak – and this puts additional pressure on car manufacturers. However, a certain reluctance and path dependency can be recognised in responses of the mainstream car manufacturers to the emerging value creation models and new-coming actors. At best, car manufacturers are working on making marginal optimisations of existing technologies and mobility systems, but they clearly shy away from taking on macro-challenges that the sector faces, which require reconsideration of traditional business models for providing mobility services to people.

This supports the findings from literature that product and process innovations are typically incremental innovations and that business model innovation creates a new form of exchange between a company and its customers, its suppliers, and its employees (Amit and Zott 2012). The car manufacturers are the dominant actors of the prevailing private car regime locked into old ways of thinking and with large sunk investments in car producing facilities. The new-coming players, e.g. car- or bike-sharing organisations, are small and flexible organisations that often target specific local market. They typically operate in niche markets and thus have not only to develop alternative ideas for mobility provision, but also to find ways to collaborate with other than incumbent companies actors. Therefore, car sharing often collaborate with public transportation companies, car rentals and leasing firms, taxi companies and bike-sharing organisations. The new constellations of actors mean new interactions and relationships among them, which might require new ways and types of learning and sometimes even establishing new "rules of the game" in the prevalent regime (Mont and Emtairah 2008). These ideas are further discussed in the section on cognitive institutions.

Institutional dynamics

Existing studies indicate that business model innovation often catalyses a broader system change either by triggering other companies to consider alternative ways to satisfy people's needs and to take a stand towards newcomers, by initiating change in social norms and values in society or by driving change in regulatory, economic or other institutional frameworks.

Institutions

New constellations of actors often depend upon or entail changes in institutional and infrastructural contexts, regulations and even social values. Indeed, institutional settings shape and influence the emergence, evolution and success of innovative value creation models. They can be categorised as regulatory, normative and cognitive institutions (Scott 1995: 33-45).

Regulatory institutions comprise laws and regulations, various kinds of administrative and legal instruments, as well as economic and financial mechanisms and information-based strategies to support or hamper certain developments in the society.

Policies and laws advancing certain business models in general and IVMs in particular are rare (Bisgaard, Henriksen, and Bjerre 2012); however some examples of supporting mechanisms for

IVMs could be identified from the case studies analysed. One example is restrictions on private car use in urban centres and availability of parking spaces at train stations designated for car sharing, which send a signal to the public about the preference for shared cars.

Another example is A@rstiderne in Denmark, which capitalised on the existing demand from customers for organic food, which was otherwise difficult to find in mainstream stores. Denmark was one of the first countries in the world to introduce legislation on organic production in 1987 and to support organic farming (Frederiksen and Langer 2004). The concept of A@rstiderne was also made possible because it was built on a shared risk between the farmers and the customers through a pre-payment scheme. According to the company, A@rstiderne is now a business run without subsidies, providing an opportunity to other organic farmers to join in and challenging the conventional agriculture sector.

The *normative institutions* include values and norms in society and these are of major importance both for developers of IVMs and their consumers and users. One example is the idea of sharing cars, which has for a long time contradicted the established norm of car ownership and the perception of a car as a status symbol. Therefore, many car sharing organisations have been working on improving the image of shared cars as a status good, e.g. Mobility, a Swiss-based car sharing organisation, sacrificed having its logo on shared cars in order to satisfy the needs of its members for status.

In traditional business models the role boundary between producers and consumers is clearly defined and consumers are typically assigned a passive role, but in many IVMs the role boundary is becoming blurred as consumers are becoming active players on the market who not only define and vocalise their needs, but become co-producers and co-creators of alternative systems of production and consumption. Three types of the dynamics can be observed in these models.

The *first* one reflects the changing role of individuals who, in addition to being consumers, take an active role in customising what is being produced through the so-called user-driven design (e.g. sneakers design by Nike). In this way, the final offer is customised to the needs, preferences and financial situation of the user. There are numerous examples when products, from sneakers to cars, are being shaped by online users, who can express their unique preferences with regards to product colour, size, specific additions and aesthetic features. A more advanced type of co-production is the production on demand, when products are manufactured only after the request from the market. This model has potentially significant implications for resource flows in society as only the products that are actively requested by users would be produced, and production of many products that are not sold could be avoided. Community-supported agriculture is based on the same principle, where consumers pay upfront to famers thereby guaranteeing that agriculture produce will be bought and potential costs of low harvests are shared. Besides environmental implications, such schemes have positive social implications for economic security of farmers.

The *second* type of dynamics assumes an active role of consumers in the production of utility, e.g. households become producers and consumers of electricity, district heating or hot water. Another variation of this is the open source innovation when anybody can contribute to the development of a new computer program, a game or a unique collaborative platform by building on what has been previously produced and shared by other users.

The *third* type of dynamics reflects the engagement of individuals in co-creating alternative systems of consumption based on, for example, sharing and exchange and actively participating in the systems of collaborative consumption (Botsman and Rogers 2011; Murray, Gaulier-Grice, and Mulgan 2010).

These dynamic mechanisms have potential consequences not only for the conventional production-consumption and producer-consumer dichotomy, but also eventually for the resource flows in the society. A similar change in the role-boundary structure of the market actors can be observed in all analysed cases. For example, the straw based neighbourhood heating plant in Horbelev was started by villager dwellers themselves, who own the plant. They

received support from the municipality who acted as a warrantor for the bank loan and who also owns the heat and hot water distribution network. Five villagers - farmers, who have written contracts with the plant, supply the straw to the plant. Thus the users of the district heating and hot water became producers of these utilities. These findings are supported by the previous observations from the literature on product-service systems, which show that sometimes effective and efficient satisfaction of people's needs takes place when non-traditional actors, who are typically placed outside the traditional supply chain, are involved. The cases in this article further extend this view by first of all going beyond the private companies in supply chains, and by including public organisations (e.g. municipalities, public authorities etc.) and individuals. This finding speaks to a need to extend the borders of the analysis from private-public partnerships towards public-private-people partnerships.

In addition to the consumers taking over the production of goods and services, the consumption of these goods and services also becomes a field for new markets and IVMs. For example, in the case of second-hand/vintage goods the entrepreneurs capitalise on saturated markets of durable and fast-moving products and on the growing idling capacity of these products in a private possession. This enables the entrepreneurs to create common platforms for the exchange of goods in a private possession (e.g. online market places) allowing consumers to exchange goods and services. It can be seen as a revival of our traditional ways of living in social groups where sharing and lending, as well as bartering and swapping, was a natural part of everyday life. People used to exchange both products and services and to come together to fulfil the needs of individual members of the community, e.g. building a house for a young family. The Renaissance of such collaborative consumption schemes and alternative ways of delivering value to people can be explained by the existence of well-known concepts such as libraries, laundromats, car rental companies, families and friends passing on children's clothes etc.

In addition to products and their idling capacity, people also possess many skills and would like to share them or trade them with others, at the same time better utilising their life experiences and capabilities, extending their social network and learning from others (e.g. ourgoods.org). Another human feature is that people might get easily bored having the same art on the walls or sport equipment at home for several months, and therefore seek to organise swapping events and bartering networks (e.g. a designer Peter Viksten gives away free art in Sweden).[3]

In addition to normative institutions, also *cognitive institutions* play role. The cognitive institutions address the learning processes that help individuals understand and make sense of reality. Individual cognitive processes, including decision-making with regard to production-consumption and the environment, are rather group-oriented and are affected by social norms prevalent in the society. Some of the cases in this article offer useful insight into how cognitive processes of individuals could be shaped into more sustainable direction if they are targeted by specific strategies and activities.

For example, in the case of Danish island Samsø a large network of different actors was created, comprising the administrators of the energy project, local citizens, farmers, small businessmen, the municipality, and the national government (MESPOM 2009). However, from the beginning, many actors were reluctant to engage in the project. The project leader took the initiative and established Samsø Energy Academy in 2007, which became a meeting place for local residents and tourists. Knowledge and engagement of the project leader created a high level of trust and close relationships among the project players and community. More importantly, everyone had a chance to get involved in the decision-making process from the very beginning. General public participated in the meetings where the decisions on the electricity and heat supply, transportation and technology alternatives, infrastructure, costs, payback times, and avenues for participation were made. In addition, a number of information campaigns and activities took place including training, house calls by energy advisors, open house visits, and working groups

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[3] http://www.trendhunter.com/trends/art-you-cant-own-designer-peter-vikstens-free-art-happening-in-sweden

with the municipality, project managers, and utility firms (MESPOM 2009). Local authorities were also involved in bringing together different actors and founded the Samsø Energy Company together with the Farmer Association, Samsø Energy and Environment Office, and the Commercial Council. Although some training was needed in order to involve local craftsmen in the energy projects, islanders already had most of the capacity needed to participate. This fact has also contributed to the increased acceptance and the sense of belonging to and ownership over the project. As more and more inhabitants became involved, social pressures to join instead of "free ride" also helped to empower participants.

The role of innovative value creation models for sustainable living

While product and process innovations are still needed for businesses to stay afloat and be able to gain competitive advantage, business model innovations are recognised as particularly important since they offer an often underutilised source of future value (Amit and Zott 2012), and are particularly crucial when it comes to sustainability transitions (Whisnant 2013). Following the tentative characteristics of IVMs in the beginning of this paper, one of the fundamental distinctions between traditional business models and IVMs is that IVMs normally include environment, well-being and quality of life as purpose of the IVMs in addition to economic values and financial profit. This section seeks to critically analyse IVM examples from the four consumption sectors and discuss whether this is always the case.

In the *energy and housing sector*, the substitution of traditional fossil fuel based systems with renewable energy plants for the generation of electricity, heat and hot water delivers climate and environmental benefits due to the avoidance of GHG and other pollutant emissions linked to the combustion of fossil fuels. In addition, direct engagement of energy users in the generation of renewable energy increases their awareness about environmental and climate change challenges and improves their knowledge on more sustainable energy solutions. Moreover decentralised renewable energy production and supply has positive implications for energy security provision, local socio-economic development via rural diversification and employment creation.

In the *food and drink sector*, the provision of organic food directly to consumers particularly by more environmentally friendly transportation means (e.g. biogas vehicles, electric cars or bicycles) reduces environmental impacts from consumers travelling to the store by car. In addition, the customers are likely to purchase less of conventional food products, the production of which entails the use of pesticides and chemical fertilisers, hormone treatment, monoculture cropping that leads to biodiversity and soil fertility losses, and intensive livestock production with associated environmental pressures. Moreover organic food consumption has positive implications for human health and well-being. However, if the customers continue using car to satisfy other shopping needs and/or purchasing non-organic products from other sources, environmental benefits of this model can be somewhat undermined.

In the *mobility sector*, the choice of different mobility options combined with real-time information hold a promise to affect levels and patterns of consumption and resource use in society by reducing reliance on private car use and instead sharing the use of other means of transport, both public – buses and trains and private – car sharing and ride sharing options. This promise holds true if people abandon private car ownership and use integrated mobility systems instead and not in addition to using own car.

In the *consumer goods sector*, one important feature of the discussed IVMs is that they search for new ways to create value without using more resources. Swapping and leasing enables individuals to get access to products and satisfy their needs without purchasing new ones. Efficient re-use, recycling and upcycling strategies have a potential to reduce a need for the production of new goods and therefore reduce resource use and environmental pollution associated with the production processes. However, not all products might be suitable for swapping, leasing or reselling due to hygiene as well as cultural values.

Reflections on cross-sectorial differences and similarities between IVMs

A number of *similarities* can be identified when looking across sectors and IVM examples, which are discussed below.

First, all analysed IVMs have shown the potential to contribute to more *sustainable living* and reduce environmental impacts along one or more steps in the product or service value chain including production, consumption and the end-of-life. In addition to direct impacts on the promotion of more sustainable lifestyles among consumers, IVMs often make indirect contributions through their actions towards increased *awareness* on environmental and sustainability issues among their users and other related stakeholders. This occurs either through targeted campaigns (e.g. organic food and drink festivals, sharing information on the Internet about healthier and more environmentally sound diets or GHG emission reductions linked to the purchase of used goods instead of the new ones etc.) or by engaging new actors into IVMs (e.g. energy users participate in renewable energy generation through their membership in a cooperative).

Second, while all IVMs have shown a potential to deliver environmental and socio-economic benefits, some of them may be better suited than others in terms of supporting sustainable lifestyles. The success largely depends on how IVMs are implemented, as there is always a risk for *rebound effects*. For example, often people use integrated mobility schemes in addition to private cars and not instead of car ownership or they sell used goods on the second-hand market in order to upgrade to a new product and not just get rid of goods they do not use. In the latter cases redistribution markets could increase consumption and associated resource use. A recent study of eBay traders found that "an opportunity to get rid of things" and "cleaning out" are the main drivers for selling used goods online (Clausen et al. 2010).

Third, when analysing and comparing IVMs in all sectors *the role of ICTs* becomes critical. In many cases ICT fulfils the role of enabler for IVMs, which otherwise would not be functional or would have a reduced outreach to their customers and therefore doubtful competitive advantage. For example, both cases from the food and drink sector use food orders via Internet in addition to more old fashioned bookings via telephone or in person, which helps the IVM actors optimise their food deliveries and to cover a broader geographical area. In the mobility sector, the IVMs would simply not be functional without the Internet. In consumer goods sector, the majority of peer-to-peer markets operate through online platforms. This concerns not only ordinary buy-sell markets, but also exchange, sharing and leasing of goods. Besides ICT facilitated social networks, ICT support learning from other companies and soliciting feedback on the companies' actions. Networking is arguably important for new behavioural trends such as peer-to-peer consumption and product reuse and upcycling.

Fourth, an important factor observed throughout IVM cases, which supports their competitive advantage on the market against the established businesses, is *convenience*. It is evident that IVMs seek for new and more comfortable ways of delivering products or services to customers (e.g. customers of organic food box schemes make their orders online from home and get the food delivered to their doors; the users of Blocket buy or sell goods any time of the day or night regardless of the opening hours in retail).

In addition to the described similarities between IVM cases and consumption sectors analysed, a number of *differences* have also been identified. In studies of systems of innovation in different sectors, Malerba (2005) demonstrated that differences exist between *sectorial systems of innovation*. Therefore, it is important to analyse whether there are sectorial differences also among business models. Earlier studies indicate that in some sectors, mostly among *business-to-business (B2B) market relations*, large disparities are observed in the level of penetration/dissemination of IVMs, such as product service systems. Chemical management services penetrated 80% of car manufacturing sector and selling "power by the hour" takes place in 50% of aeronautic companies (Mont and Emtairah 2008).

In the current study, the first main difference between various IVMs refers to *market relations* they represent. Some models include business-to-consumer (B2C) markets, e.g. organic food supply to the customers, integrated mobility systems, others operate on consumer-to-consumer (C2C) basis, e.g. online second-hand markets for goods, sharing markets etc., others represent consumer-to-business (C2B), e.g. co-production of renewable electricity and selling it to the grid, or business-to-business markets (B2B), e.g. the case of Interface documented elsewhere (Mont and Emtairah 2008).

Analysis of IVMs in *B2C markets* presented above demonstrates that there might be sectorial differences among IVMs when it comes to dynamic processes, actors and institutions. However, analysing *C2C or peer-to-peer examples* innovation transcends the sectorial boundaries. Blocket, eBay or Netcycler are virtual platforms where various types of goods and services are being sold or exchanged. Another example includes C2C sharing schemes when people share a stock of products with an idling capacity. What distinguishes IVMs from traditional business models is the fact that often *new actors* might be involved beyond the boundaries of the sector. Therefore the focus of analysis of such models should be on the dynamics and transformation of particular societal functions (e.g. provision of mobility rather than selling cars).

Conclusions and future research

Conclusions

The primary purpose of this paper was to open a new research agenda on IVMs and the role they might play in a transition to more sustainable living. This article showcased good practices of IVMs and concluded that they have a potential to support sustainable living and foster sustainability transitions since they often search for resource dematerialisation, alternative market places and contribution to social capital.

IVMs offer alternative to traditional business models ways of organising production and consumption by engaging actors other than conventional business players, including public actors and individuals. What also distinguishes IVMs from traditional business models is the fact that new actors might often be involved beyond the boundaries of the specific industry sector.

Three types of institutional dynamics has been discovered in IVMs: 1) a changing role of consumers who take an active role in customising the design of the products they consume and might as well facilitate the production of goods on demand; 2) an active role of consumers in the production of utility; 3) a dynamic engagement of individuals in the systems of collaborative consumption.

While IVMs have a potential to deliver environmental and socio-economic benefits, and contribute to more sustainable lifestyles of people, this potential depends on the way they are implemented and could be limited by associated rebound effects.

ICT is found as an important enabler for the majority of IVMs, without which their performance and functionality might be seriously undermined. Besides, many IVMs seek to deliver a higher level of convenience to customers during their order of a product or service (e.g. home delivery of products ordered online, 24/7 access to online platforms etc.), which can be seen as one of the strategies to achieve competitive advantage on the market.

IVMs are found to have a potential to catalyse a broader system change by either triggering other companies to consider alternative ways of satisfying people needs, by initiating a change in social norms and values or by driving a change in regulatory or economic institutional frameworks. One way for governments to support IVMs that are not built on the premise of selling more material products is, for example, by extending producer responsibility along the entire product life cycle. This would reposition consumers as users, where products are hired/leased/rented rather than purchased for as long as the product is needed.

Future research

While this paper sheds some light on the environmental implications of IVMs and their potential to foster sustainability transitions, there is still a need for deeper research on the ways in which IVMs influence everyday lives and prevailing institutional frameworks. In particular, the implications that the promising IVMs have for consumption patterns, consumption levels and more sustainable lifestyles and practices should be further investigated.

Another area for further research is a deeper investigation on how IVMs connect mainstream businesses with social entrepreneurs and their ways of delivering value to people. Particularly interesting issue to explore is how mainstream businesses perceive ideas of collaborative consumption actors and social innovators, and what role incumbent actors play in shaping online and physical peer-to-peer markets, as well as markets for social innovation and community-based services.

Questions of the economic sustainability and financing schemes of IVMs are also important to explore. Examples of potential research questions could be the following: How can the emergent IVMs be supported by cross-financing? What is role of the government in this regard? What is the role of 'impact investors' in enabling and collaborating with social and eco-innovation entrepreneurs? What are the mechanisms and the role of crowd-funding for shaping the landscape of social innovation and collaborative consumption.

Our analysis also demonstrates the importance of building values and developing infrastructure for collaborative networks and sharing systems to be embedded into everyday choices. This might lead to higher acceptance of such IVMs particularly in the cultures with values based on possessive individualism. Many intriguing research questions could be explored in this regard: Are examples of sharing networks a sufficient step towards more sustainable lifestyles, or whether steps towards simplifying and dematerialising our lifestyles even further are needed. Another question is whether the current policy climate enables such IVMs or serves as a barrier, and what policy mechanisms are needed to provide an opportunity for people to participate in sustainable non-technical innovations. The last question is what implications these schemes have for mainstream businesses, i.e. do they pose a threat, an opportunity to learn and innovate not only products, but also services and integrated systems; is this a way towards a collaborative economy where companies provide experiences to communities of prosumers (producing consumers) who actively participate in creating experiences for themselves and others?

Last but not least, although it has been shown that the theory on socio-technical transitions can be applied to explain the evolutionary dynamics in IVMs and co-evolution mechanisms, there is a need for deeper research on the role of IVMs in socio-technical transitions and sustainability transitions in particular, which needs to be supplemented with additional theoretical insights, e.g. drawing from network and organisational ecology theories.

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Discussant Contribution

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The two papers fit well within a workshop that aims to bring together approaches from different participatory and bottom-up endeavours, as both papers explore consumption (and production) niches represented by case studies, to then understand pathways towards local consumption transitions. I will briefly summarize the key points of each paper, discuss strengths and weaknesses, as well propose some areas for discussion that hopefully link the two papers together.

Backhaus and van Lente look at four policy initiatives aimed at supporting more sustainable food consumption routines, including an organic label, a food waste reduction initiative, a food 'license' to promote healthy eating among children, and finally the edible city, a public urban garden initiative. To analyse these case studies, they draw from transition research, organizational science and 'sense-making', as well as institutional change frameworks. They focus on what they call 'institutional entrepreneurs' or people who play a role in legitimizing the creation of institutions. The goal of the paper is to uncover the assumptions, appropriations, and actions of these actors, in an analysis of written texts and spoken discourse. The authors then try to link these initiatives to different 'human nature' prototypes.

The case studies are presented in sufficient detail, with the authors focusing in on how these efforts towards more 'sustainable food consumption' draw from and reinforce certain assumptions, and how the different actors involve interpret them. They note a distinction between efforts to provide information, versus efforts that engage people in forms of demonstration. In the discussion, the authors uncover three main narratives that are promoted through the case studies: *homo eco-economicus* (economic and ecological man); sufficiency ideas; *homo economicus moralis* (economic and moral man). One immediate question that came to mind was whether people can embody more than one 'narrative' when faced with different consumption contexts, and what the implication of this may be. Are we coherent? The authors also show how the case studies inspire three types of principles: green consumption, sufficiency, or collective experimentation. One of the main findings is that certain assumptions can be unacknowledged but valued implicitly by those involved, which in some cases reinforces the *status quo* (i.e., un-sustainable consumption). What happens if they are made explicit?

In the Voytenko and Mont paper, the authors look at Innovative Value Creation (IVC) models or novel forms of exchange that consider environmental and social values. Their goal is to showcase different IVC practices and discuss implications for more sustainable consumption. They draw from innovation systems, business model innovation, social innovation, and socio-technical transitions – merging business and social innovation studies. Ten case studies are briefly presented from among four consumption sectors. Their analysis considers different factors, including actor-network dynamics, where they note that IVCs tend to represent a shift to product-based services (e.g., car sharing over ownership) or integrated systems (e.g., platforms that offer integrated mobility services).

Through the case studies, they show that new actors seem to be entering established sectors and creating entirely new sectors, which may lead to new 'rules of the game' in a prevalent regime. In terms of institutional dynamics, new IVCs both come from and cause changes in an institutional context, including policies but also norms and values, and what they call 'cognitive institutions'

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or how people understand different processes. They also note how the role boundary has changed, from the sole category of 'consumers' and 'producers' to new roles such as co-production, co-creating alternative systems, production on demand, community-supported agriculture, etc. Briefly, the authors claim that IVCs tend to have an overall positive impact on the environment, with some caveats, as well as a positive impact on awareness. The article is engaging, in that a new perspective – that of IVCs – is proposed, but perhaps it would have benefited from less case studies presented in more depth, and a more narrow conceptual framework that might have shed light on one aspect of IVCs – either the changing roles and actors, or changing institutional contexts and values, or changing practices, for example.

As I am not an expert on the literature behind the conceptual frameworks of both papers, I cannot comment on their contribution to that literature, but will draw out three main discussion points:

1. Question of values and goals:
   - Understanding the 'assumptions' in initiatives or the exact 'value' they seek to promote is a central theme in both papers, but one that merits exploring further.
   - Are we clear about what values we need to put forward in the 'sustainable consumption' community, towards transitions? Beyond the general goals of 'social, environmental and economic values,' are there certain things that should be valued above others? This seems to be one of the main issues with 'sustainability,' being clear and explicit about value systems.
   - The social and solidarity economy (SSE) has explicitly placed people and planet above profit, and the value system is very much emphasized both in theory and in practices. What can we learn from the SSE (also being approached as New Economics)? Should we be bridging with that community of researchers and practitioners? Is it important to place different economic activities in relation to the market economy, as opposed to other forms of exchanges (redistribution, reciprocity, etc.)
   - In all case studies, I would challenge the authors to further consider: what is the ultimate goal we are trying to achieve? Are we getting to an overall reduction in consumption, or more consumption in a different way?

2. Question of power and responsibility:
   - The papers also discusses how certain initiatives are being framed and how they appeal to different 'types' of people. It may be worth thinking about the question of power and responsibility.
   - For example, is it the consumer who should choose organic? Is it the household that must decrease food waste? What if supermarkets were responsible for only allowing environmentally and socially sound products on their shelves, and do they have the power to do so? Do we need to 'consume carefully' or is the majority of food waste happening elsewhere, at retail level and in restaurants? What is behind overly moralistic messages about how everyday people consume?

3. Question of real impacts:
   - In most cases, I would also be optimistic about the projects being discussed here, but measuring actual impacts would be necessary. Can impacts be measured? Are they being measured and against what indicators? Over what scale and time period?
   - In the Nike offer, whereby consumers are invited to customize their sneakers, can we know for sure that this leads to less overall consumption? It seems hark back to notions of 'shopping as a identity seeking' popular in the 1980s and 1990s, with the added support of technology. In this example, are people really encouraged to buy less?

Discussion Report

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Derk Loorbach, serving as the session's moderator, opened the plenary discussion by challenging the group with the assertion that the proposed alternative models sounded very nice, but left a doubt of mere green washing of lifestyles without any real change further upstream in the production chain. Adding to this first observation, one participant equally questioned the real impact on lifestyles by pointing to the consumption habits prevailing among many young people focused on buying ever more, often low-quality clothes and gadgets. Yuliya Voytenko concurred that the sustainability contribution of the production and consumption models proposed in her paper indeed still needed to be examined in more detail.

Another participant raised the question how the examined product-service models might affect the workforce. The presenters replied that some of the models such as Community Supported Agriculture (CSA) schemes for example could also create new jobs locally.

With respect to the Backhause/Lente paper, participants questioned the choice of the term 'organising principle' as opposed to alternatives such as 'discourse' as well as the distinction between the 'homo eco-economicus' and 'homo economicus moralis', pointing to inconsistencies in real-world consumption behaviour of individuals. In her response, Julia Backhaus clarified that her research examined the assumptions of humans that underlie the assessed campaigns and programs, not the consumption behaviour types as such.

Another participant asked about people's motivations to use innovative value creation models. Yuliya Voytenko explained that value creation is always one element of the motivation, while the wish to contribute to environmental improvement and provide social benefits often also plays a role. This intervention led to wider discussion about how to delineate some business models as model for 'sustainable living' linked to the underlying question how to define sustainability. Yuliya. Voytenko explained that for their research the authors searched for models with some element of environmental, social or well-being concern, but did not quantify or measure it in any way. Derk Loorbach added a question of scale by asking how many people needed to be reached by any of the models for it to qualify as element of a wider 'transition'. Walter Wehrmeyer remarked that an overlap between the two papers consisted in the difference between innovation and transition. While he sees innovation is directionless, transitions have clear target, prompting the group to think about how to direct innovation. Derk Loorbach disagreed with this statement.

Gábor Király asked Julia Backhause if she had also come across consumer identities based on non-consumption? She replied that non-consumption was included in the 'homo economicus moralis'. She also explained that non-consumption was an absolute no-go for projects which involve retailers, but could be included in church projects.

The last part of the discussion evolved around the pathway implications of the examined models, reflecting on conditions for mainstreaming. The two presenting authors and the discussant agreed that before thinking about scaling up, the innovative models need to be evaluated more thoroughly with respect to their social and environmental benefits. They also pointed out that strategic thinking about mainstreaming is already ongoing within some of the initiatives, but might not be the appropriate approach for others.

2a

Individual and structural factors in pathways for sustainable consumption

Towards a governance of sustainability transitions
Giving place to individuals

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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 main-streaming 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 Schäpke (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.).
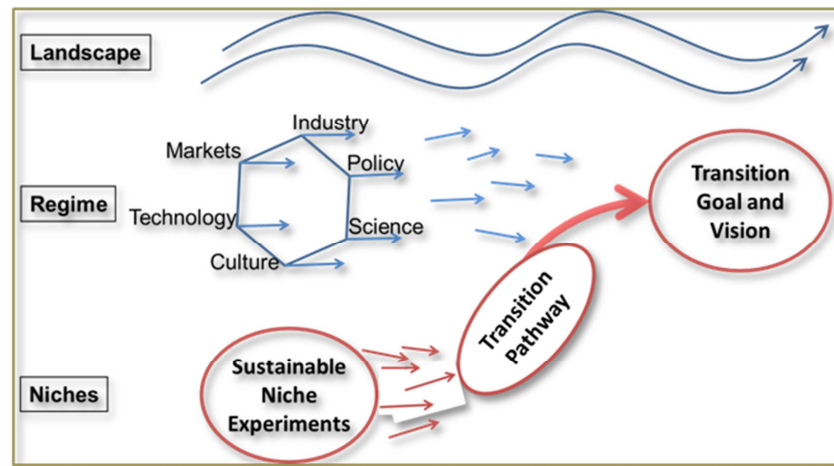
Figure 2: Multilevel perspective on sustainability transitions (changed from Geels and Schott 2007)

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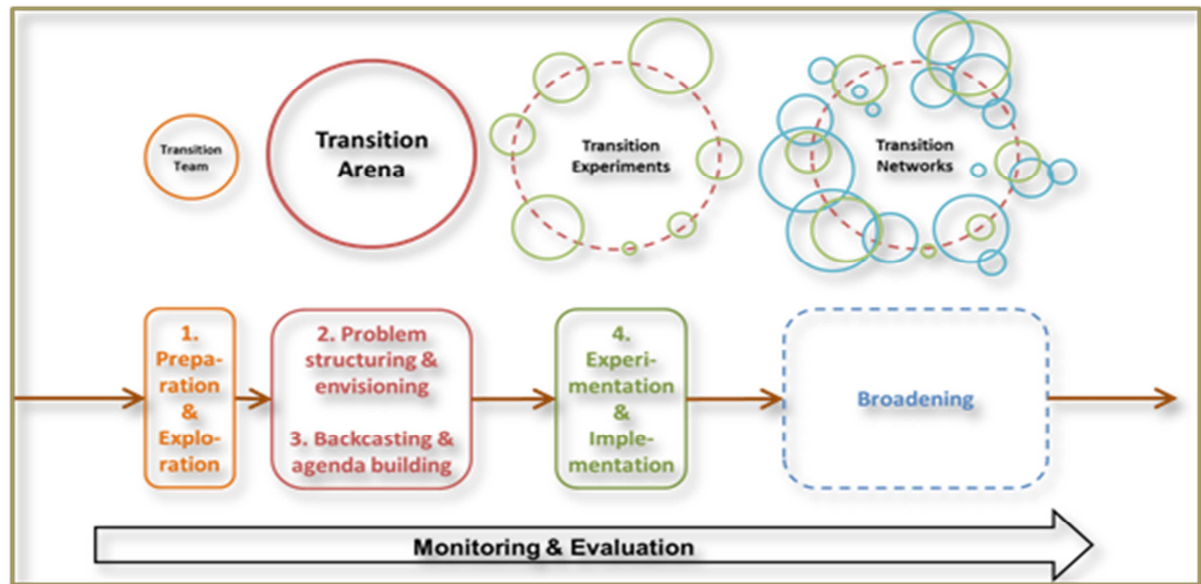
Figure 3: Transition Management process (Wittmayer 2013 referring to Roorda et al. 2012)

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 Steenbergen & 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 process[1].

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 CO_2-neutrality, silence etc. Cycling to work requires certain resources (first of all: a bike) and is enhanced by the conversion factors such as

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[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.
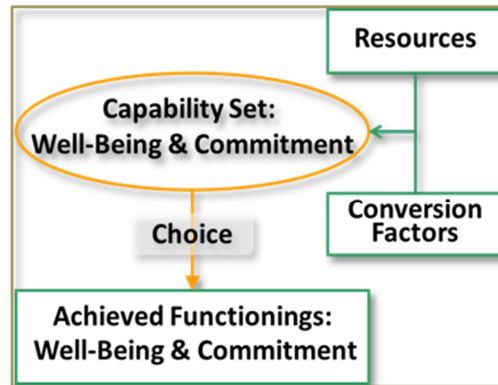

Figure 4: A simplified representation of the capability approach

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 resources[2] (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 citizens[3].

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

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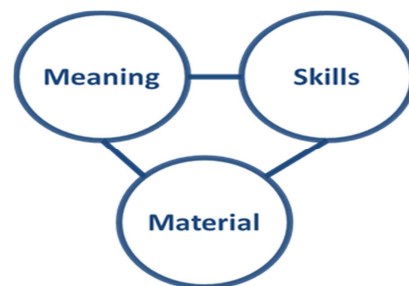
Figure 5: The three elements of practices (inspired by Shove 2003)

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 CO_2-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 CO_2-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.
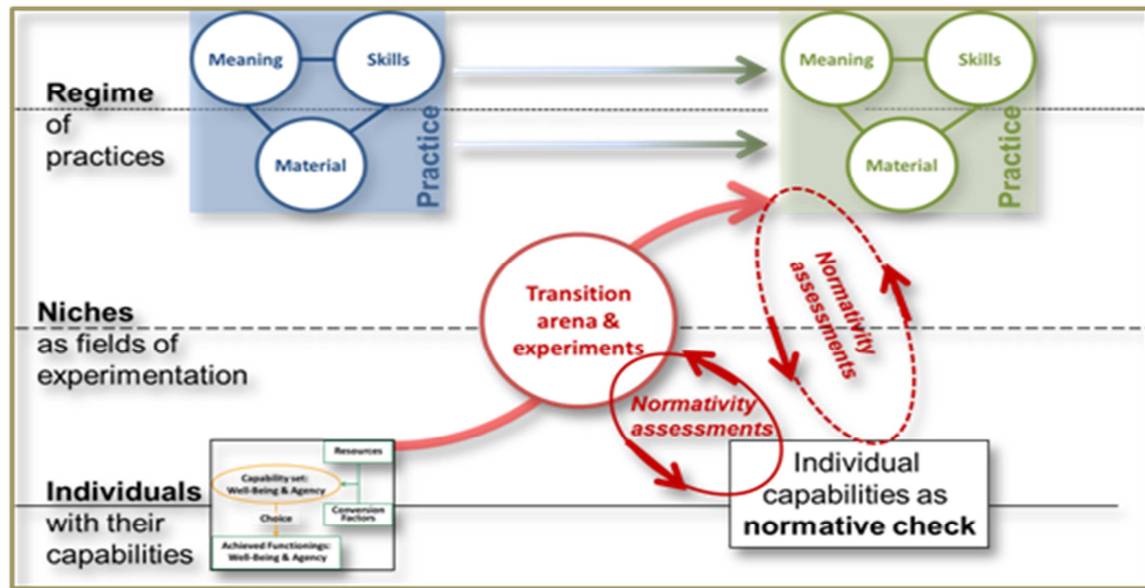
Figure 6: Assembling practice theory, transition management and capability approach for governing sustainability transitions

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, Schäpke 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. Schäpke 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 change[4] 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 two[5] 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

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[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, Schäpke & 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 Schäpke 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 grassroot 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 fundaments 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 grassroot 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, inter-personal 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 fundaments 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

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Testing causal models of behavior to define pathways for change in organizations

Results from the LOCAW project

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Abstract

Patterns of unsustainable production and consumption have been recognized as main causes of climate change. The renewed Sustainable Development Strategy 2006 of the EU states that "the main challenge is to gradually change our current unsustainable consumption and production patterns and the non-integrated approach to policy-making" (European Council 2006, p.2). Despite cross-cutting multidisciplinary research and policy efforts in most European states it has not been possible to achieve significant changes in consumption and production which would reverse or slow down the devastating projections outlined by the Intergovernmental Panel on Climatic Change (IPCC) Fourth Assessment Report (2007) for our ecosystem.

The LOCAW project has as its objectives to advance understanding of the drivers of and barriers to sustainable lifestyles by an integrative investigation of the determinants of everyday practices and behaviors within large scale organizations on different levels: by analyzing the patterns of production and consumption in the workplace; analyzing organizational strategies to reduce emissions; investigate practices at work and their relationship to practices outside work; and the patterns of interaction between relevant agents and stakeholders in the organizations ´environment.

In order to understand the determinants of (un)sustainable practices in organizations, the LOCAW project has studied social, organizational and individual factors influencing three categories of practices: the consumption of materials and energy, waste generation and management, and work-related mobility. In this paper, we have focused on individual factors affecting practices at work, and have shown how theoretical models hypothesizing relationships among them and complex causal chains can be tested through statistical methodologies such as structural equations modeling techniques. We briefly discuss these results.

Keywords: large-scale organizations; sustainable practices, causal models, individual factors.

Introduction to the LOCAW project

Patterns of unsustainable production and consumption have been recognized as main causes of climate change. The renewed Sustainable Development Strategy 2006 of the EU states that "the main challenge is to gradually change our current unsustainable consumption and production patterns and the non-integrated approach to policy-making" (European Council 2006, p.2). Despite cross-cutting multidisciplinary research and policy efforts in most European states it has not been possible to achieve significant changes in consumption and production which would reverse or slow down the devastating projections outlined by the Intergovernmental Panel on Climatic Change (IPCC) Fourth Assessment Report (2007) for our ecosystem.

This is also recognized by the progress report on the EU's Sustainable Development Strategy 2008, which concludes that "although a wide range of actions is being initiated, there is only limited evidence in the area of sustainable consumption and production (SCP) that countries are scratching beyond the surface of this fundamental objective" (ECORY p.8). One year later the 2009 Review of the EU´s Sustainable Development Strategy highlights the fact that "despite considerable efforts to include action for sustainable development in major EU policy areas, unsustainable trends persist and the EU still needs to intensify its efforts" (p.15).

While some reductions can be made through carbon trading and other flexible mechanisms agreed upon under the Kyoto protocol, with some countries overachieving agreed-upon goals (see: European Environmental Agency, 2009), in the long term it is vital to enhance the efforts of individuals, organizations, and societies at large to reduce greenhouse gas emissions through changes in the patterns of production of goods and services as well as regarding their consumption.

Governments now recognize that climate change and its consequences need to be addressed by changing peoples´ behavior and everyday practices and that technological fixes alone will not be enough. Even where they can play a role the environmental effectiveness of technological "solutions" is contingent upon the way in which users engage with and deploy them (Midden, Kaiser and McCalley, 2007).

The LOCAW project has as its objectives to advance understanding of the drivers of and barriers to sustainable lifestyles by an integrative investigation of the determinants of everyday practices and behaviours within large scale organizations on different levels:

a) analysing the patterns of production and consumption in the workplace with their resulting GHG emissions;

b) analysing organizational strategies to reduce emissions and implement EU regulations regarding the "greening" of their production processes.

c) everyday practices and behaviours at work of employees on different levels of decision-making within the organization.

d) the relationship between behaviours and practices at work and behaviours and practices outside work.

e) the patterns of interaction between relevant agents and stakeholders in the organization's environment and the resulting barriers and drivers for implementing sustainable practices and behaviours in the workplace.

Sustainability research and models predicting sustainable behavior have, to this date, shown that these topics are highly complex and multi-faceted. Understanding the complex determinants of sustainable behavior and transitions to sustainable everyday practices in different life contexts of an individual requires multidimensional conceptualizations and the study of individual and contextual factors affecting behavior.

In order to map this complexity in a meaningful manner, the LOCAW project has undertaken the study of large scale organizations across Europe, both public and private, in order to understand

the barriers and drivers to achieving transitions to a low-carbon Europe. As workers, people spend a large amount of time in workplaces, in a community that holds the potential to influence behavior and to become a site for learning new practices. People also bring their values, identities, motivations and outside habits to work, thus also potentially transforming workplaces.

Each of the case studies of LOCAW focuses on one large scale organization in a different EU country. In four of the cases, the focus is on the everyday practices of the organization itself and the interactions between structural/organizational conditions and individual factors in generating barriers to and drivers for a sustainable transition to a low carbon Europe (the cases in Spain, Romania, The Netherlands, and Italy). While the interactions of the organizations with relevant outside agents forms part of the study of structural conditions in these cases, two case studies are ethnographic studies of two companies, including their management, their trade unions and their workforce. These two case studies will also look at the relationships between everyday behaviours at work and behaviours outside work (in the United Kingdom and in Sweden). The data obtained from all these case studies is then synthesized and fed into agent-based models from which policy solutions will be derived.

The role of individual factors in sustainbale practices in organizations

Understanding the role of individual and contextual factors, and of their interaction, in determining behavior at work provides useful information in designing pathways for change. This requires information on the role of different factors and the weight they have in determining the final result.

The literature on the psychological influences on sustainable behaviour have mainly focused on individual level factors, because individuals have mainly been conceptualized as consumers. Also, the majority of existing studies have focused on behaviours related to household energy use and recycling and very few studies have specifically targeted work related behaviour (e.g., Lee, 1995). Among the individual factors considered relevant for sustainability-related behaviour, the most important ones are knowledge, motivations and ability.

Knowledge

While people are generally aware of environmental problems, and more specifically problems related to energy use (Abrahamse, 2007), although there is still confusion about the causal processes involved (e.g. Bord, O'Connor, & Fischer, 2000; Gorsira, Steg, Bolderdijk, & Keizer, 2009; García-Mira, 2009). Moreover, people know relatively little about the energy use associated with their daily behaviours and they tend to rely on simple heuristics when assessing it (eg. the larger the appliance, the more energy it is believed to use: Baird and Brier, 1981; Schuitema & Steg, 2005). People know relatively little about the energy use associated with water consumption (Schuitema & Steg, 2005) and the energy use related to the production, transportation, and disposal of products (Tobler, Visschers, & Siegrist, 2009).

Knowledge appeared to predict recycling at work: workers are more likely to recycle when they know what to recycle (Tudor, Barr, & Gilg, 2007). Tailored information is a promising tool to increase knowledge and to promote sustainable behaviour both at home and at work (Abrahamse, Steg, Vlek, & Rothengatter, 2005; 2007, Daamen, Staats, Wilke & Engelen, 2001).

Knowledge can be increased by providing people with feedback on their behaviour and the environmental impact of their behaviour (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Feedback proved also to be effective in promoting energy savings of employees in companies (Siero, Boon, Kok, & Siero, 1989; Siero, Bakker, Dekker, & Van den Burg, 1996). Knowledge can also be increased through specific educational strategies (Vega & Alvarez, 2006).

Motivations

In general, motivational factors are not strongly related to household energy use. Socio-demographics, in particular income and household size, are much more important: higher income groups and larger households use more energy (Abrahamse, 2007; Gatersleben, Steg, & Vlek, 2002). This is true for direct as well as indirect energy use (Abrahamse, 2007), and for energy use in home as well as for transport (Poortinga, Steg, & Vlek, 2004).

Motivational factors are important for understanding intentions and willingness to save energy. People have a stronger intention to reduce their energy use when they have a favourable attitude towards energy conservation (Abrahamse, 2007). Attitudes towards energy conservation correlated strongly and positively with intentions to conserve energy at the workplace as well (Scherbaum, Popovich, & Finlinson, 2008).

Environmental considerations are not strongly related to intention to reduce household energy use. So, even though concern with environmental and energy problems is generally high in Western countries (Abrahamse, 2007; Poortinga, Steg, & Vlek, 2002; Schultz & Zelezny, 1999), people often do not act in line with their concerns, that is, many people attach a low priority to saving energy. This suggests that energy use and energy conservation are not only driven by concerns about environmental and energy problems. Many other factors play a role, such as status, comfort, effort, and affect (Stern, 2000). In general, people are less likely to reduce their energy use when saving energy involves high behavioural costs in terms of money, effort or convenience.

Motivational factors do play an important role when explaining specific environmental behaviours. For example, attitudes, norms and perceived behavioural control appeared to be predictive of travel mode choice (e.g., Bamberg & Schmidt, 2003; Heath & Gifford, 2002), the purchase of energy-saving light bulbs, use of unbleached paper, and meat consumption (Harland, Staats, & Wilke, 1999). Interestingly, car use appeared to be strongly related to symbolic and affective motives, while instrumental motives such as costs and environmental concerns were less important (Steg, 2005; see Gatersleben, 2007, for a review). Attitudinal factors correlate moderately with specific sustainable behaviours at the workplace (i.e., turning of appliances or lights when not in use; Scherbaum, Popovich, & Finlinson, 2008). Workers appeared to be more likely to recycle when they had favourable attitudes towards recycling (Tudor et al., 2007).

Various studies reveal that people are more likely to engage in pro-environmental actions when they endorse values beyond their immediate own interests, that is, self-transcendent, pro-social, altruistic or biospheric values, while egoistic or self-enhancement values are negatively related to pro-environmental behaviour (De Groot & Steg, 2007; 2008b; Nordlund & Garvill, 2002; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995). Moreover, a higher environmental concern is associated with acting more pro-environmentally, although these relationships are generally not strong (e.g., Poortinga, Steg, & Vlek, 2004; Schultz & Zelezny, 1998). Also, pro-social value orientations might work jointly with group identification in predicting individual willingness to save limited natural resources, such as water (e.g., Bonaiuto, Bilotta, Bonnes, Ceccarelli, Martorella & Carrus, 2008).

Social norms can have an important impact on sustainable behaviours including household energy use (e.g., Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). However, one study revealed that social norms were only weakly related to recycling at work (Tudor et al., 2007). Sustainable behaviour can be promoted by providing information on the behaviour of others (Goldstein, Cialdini, & Griskevicius, 2008), but social norms may also reduce the likelihood of sustainable behaviour. For example, people are more likely to violate a particular social norm when they see that others violate that specific norm as well (Cialdini, Reno, & Kallgren, 1990; Cialdini, Kallgren, & Reno, 1991). Also, norm violations spread, that is, when people see that a particular norm is being violated, they are more likely to violate other norms as well (Keizer, Lindenberg & Steg, 2008).

This suggests that it is of particular importance to study social norms related to sustainable behaviours. Information on the behaviour of others appears to be particularly effective if it concerns relevant others (e.g., employees from another company unit; Siero et al., 1996), while information on the

behaviour of generalised others proved not to be effective in promoting sustainable behaviour at work (Daamen et al., 2001). For example, a study by Carrus, Bonnes, Fornara, Passafaro and Tronu (2009) showed that descriptive "local" norms (i.e., the behaviour of other people very close to the individual, such as neighbours) might be important predictors of intentions to recycle.

Various studies revealed that sustainable behaviour, and more particularly car use, is habitual (e.g., Aarts & Dijksterhuis, 2000; Aarts, Verplanken, & Van Knippenberg, 1998; Klöckner, Matthies, & Hunecke, 2003). Fujii and colleagues found that temporarily forcing car drivers to use alternative travel modes induced long-term reductions in car use (Fujii & Gärling, 2003; Fujii, Gärling, & Kitamura, 2001) and was thus effective in breaking habits. The impacts of such temporary changes were particularly strong for habitual car drivers. Likewise, a work by Carrus, Passafaro and Bonnes (2008) found that past behaviour, together with anticipated emotions, is a significant predictor of intentions to recycle household waste and use public transportation to go to work, in addition to attitudes, norms and perceived behavioural control.

Ability

Individual ability and opportunities to engage in sustainable behaviours strongly depend on the structural and organisational factors discussed above. However, structural and organisational factors may be perceived and experienced differently. Therefore, it is not only important to study structural and organisational factors objectively, but also to study the perceptions of these factors. This is reflected in the perceived individual abilities to engage in sustainable behaviours. Indeed, perceived behaviour control predicts intention to reduce energy conservation (Abrahamse, 2007), intention to reduce car use (Bamberg & Schmidt, 2003), bus use (Heath & Gifford, 2002), the use of unbleached paper, the use of energy saving light bulbs, water conservation, and the use of other transport modes than the car (Harland et al., 1999). The importance of organizational climate and culture for example, which has been consistently highlighted in relation to factors such as work motivation and satisfaction, or organizational citizenship behaviours, (e.g., Kopelman, Brief & Guzzo, 1990; Schneider, 1985), has been scarcely investigate in relation to sustainable workplace behaviours.

A study by Brothers, Krantz and McClannahan (1994) revealed that physical facilitation can be a crucial factor in promoting sustainable behaviour: when recycling containers were at close proximity to office workers, they recycled between 85 to 94% of all paper, while only 28% of paper was recycled when a central container was provided only.

Predicting environmental behaviour

There have also been attempts to model predictors of environmental behaviour. Particularly influential frameworks for assessing environmental attitudes and behaviour, especially in respect of consumption behaviour are the Theory of Planned Behaviour (Ajzen, 1987) and the Commons Dilemma paradigm (Vlek, 2000), while beliefs, values and social norms have been explored by Dunlap and van Liere's New Environmental Paradigm (1978; 2008) and modelled using, for example, the Norm-Activation theory (Schwartz, 1977) and the Value Belief Norm Theory (Stern et al., 1999) which formalises the linkage between values and norms. The Attitude-Behaviour-Constraint Model (Stern, 2000) and the Needs-Opportunities-Abilities (NOA) model of consumer behaviour (Gatersleben and Vlek, 1998) have sought to overcome the internal/external dilemma by incorporating contextual opportunities and constraints into their understanding of the dynamics of people-environment relationships. Other theories such as cultural theory begin to approach a more macro-level perspective by equating individual orientations with different forms of societal organization (e.g., hierarchical vs. egalitarian). There have also been attempts to devise more integrational models such as Stern's Attitude-Behaviour-Constraint Model (2000) in which an attempt is made to overcome the internal/external dilemma by understanding the dynamics of the relationship between people and their environment (Bonnes, Uzzell, Carrus, and Kelay 2007, Uzzell, Pol, and Badenas 2002; García-Mira et al, 2003, 2005). The complexity of sustainable consumer behaviour changes in terms of their embeddedness in everyday life and its relationship to societal forces and practices is well reflected in Shove's (2005) categorization of consumers as decision-makers (e.g., shoppers), as citizens influencing the provision

of sustainable options, and as practitioners implicated in the reproduction of taken-for-granted practices.

As the conceptual complexity of models becomes more sophisticated and tries to incorporate salient consumption factors, so their practical applicability diminishes. Despite the sophisticated models which have been devised to explain consumer behaviour, when it comes to changing such behaviours the methodologies employed are often highly individualistic, placing a great reliance on persuasion, education, and even coercion through financial incentives and penalties and regulations. However, knowledge and positive attitudes may not be sufficient to encourage behaviour change, even among those who know what to do and would like to do it. Likewise, having the knowledge and material means equally may not guarantee action (Uzzell, 2008). We can change attitudes and behaviours but the attitude/behaviour relationship is complex and non-linear; changing attitudes does not automatically lead to behaviour change, and where it does it can take time.

Furthermore, behavioural impact can be direct or indirect - we can work directly on behaviour change, or indirectly through enhancing social cohesion, and community and place identity. Socially cohesive communities which encourage place identity, and in which residents have a stake in their neighbourhood and act together will be more supportive of environmentally sustainable attitudes and behaviours than communities where cohesiveness and social and place identities are weaker (Uzzell, Pol and Badenes, 2002; Bonaiuto et al., 2008). Increasing attention, however, is now being given to community-based approaches where the emphasis is on engaging communities rather than individuals by identifying barriers to a sustainable behaviour, designing a strategy that utilizes behaviour change tools, testing impact on a small segment of the community and then rolling it out and evaluating it across the whole community. For example, community-centred efforts that use informal social networks (Gardner and Stern, 2002), and the encouragement of socially shared (injunctive) norms and the visible behaviour of 'adopters' (Nigbur, Lyons, and Uzzell, 2009). Tailoring is important, whereby different strategies will be required for different groups depending upon the different barriers they erect to sustainable behaviour (Abrahamse, Steg, et al., 2007). There is much we know already, which can be usefully drawn upon to try and change environmental and consumption behaviours, but one of the challenges is to achieve sustained behaviour change and generate spillover effects on environmental attitudes and other environmentally-significant behaviours (Thøgersen, 2003), e.g., saving energy at home and in the workplace, recycling and energy saving. People will often change behaviour for a short period but then revert to old habits and preferences. We may be able to get people to change behaviour, but what we are really asking of them is to change their lifestyle and practices.

Methodology

Procedure and sample characteristics

The questionnaire was distributed and collected via the online program Qualtrics. Participants filled out the online questionnaire consisting of three parts. First we asked the participants some general questions about their personal situation (such as age and gender) and the extent they believe to have and exemplary role in their organization (see Appendix 1). This was followed by the second part comprising questions about motivational factors (i.e. values and environmental self-identity). We randomised all items from the worldviews, environmental self-identity, norms and efficacy scales to make sure that the order of the questions did not influence the responses. Third, participants competed a set of questions on pro-environmental behaviour at work and at home. The data were collected from June 2012 until December 2012.

Table 1 gives an overview of the number of questionnaires collected, and key socio demographics (gender, age, level of education) for each case study. What we mainly see is that a majority of the respondents comes from the Spanish case study. Furthermore, we see an almost equal distribution of gender, except in the Italian sample, in all case studies and the mean age is between 41 and 45. In the Spanish case study the educational level is the highest. This is an expected consequence of the fact that the Spanish case study area is an university. The Spanish

team, taking into account the nature of the organization, considered 2 categories for 2 different types of Staff: 1) Teaching and Research Staff in leading positions (Top manager); 2) Administrative staff in leading positions (Management); 3) Teaching and Research Staff with no leadership positions (i.e. just to teach or/and just to research, or other supervisory responsibilities) (Supervisory): and 4) Administrative staff with no leadership position: administration staff, technicians (Operation level).

Table 3 Sample Characteristics

	The Netherlands	Spain	Romania	Italy	Total
N	117	255	122	124	618
% Male / Female	49% / 51%	44% / 56%	48% / 52%	70% / 30%	51% / 49%
Mean age (*SD*)	43.5 (11.13)	44.0 (9.13)	41.5 (10.21)	44.48 (10.47)	43.5 (10.05)
Level of education (*SD*)	3.63 (.83)	4.21 (1.00)	2.43 (.62)	2.98 (1.11)	3.49 (1.16)

Note: Scores on level of education could vary from 1= no education/preschool to 5=doctorate-level degree

Table 2 provides an overview of the level in the organization at which participants work. Not surprisingly, in all case study areas except the Italian, the majority of participants worked at the operational level.

Table 4 Sample characteristics: Level in the organization

	The Netherlands	Spain	Romania	Italy	Total
Top manager	-	19 (8%)	1 (1%)	9 (7%)	29 (5%)
Management	6 (5%)	4 (2%)	10 (8%)	14 (11%)	34 (6%)
Supervisory	4 (3%)	162 (64%)	22 (18%)	69 (56%)	257 (42%)
Operation level	107 (92%)	70 (28%)	89 (73%)	31 (25%)	297 (48%)

Measures

Values

We measured the strength of values by a 16-item scale (Steg, Perlaviciute, Van der Werff & Lurvink, in press). Participants rated the importance of each value as a guiding principle in their life on a scale from -1 (opposed to my values) up to 7 (of supreme importance). Biospheric values were represented by 4 items (Respecting the earth: harmony with other species; Unity with nature: fitting into nature; Protecting the environment: preserving nature; Preventing pollution: protecting natural resources). Altruistic values were also measured with 4 items (Equality: equal opportunities for all; A world at peace: free of war and conflict; Social justice: correcting injustice, care for the weak; Helpful: working for the welfare of others). We measured egoistic values with five items (Social power: control over others, dominance; Wealth: material possessions, money; Authority: the right to lead or command; Influential: having an impact on people and events; Ambitious: hard-working, aspiring). Finally, hedonic values were measured with 3 items (Pleasure: joy, gratification of desires; Enjoying: enjoying food, sex, leisure etc.; Self-indulgent: doing pleasant things). The value scales showed high internal consistency, overall, as

well as in each case study area. Therefore we computed mean scores of the items included in the relevant scales.

Environmental self-identity

We measured environmental self-identity with three items: 'Acting pro-environmentally in an important part of who I am', 'I am the type of person who acts pro-environmentally' and 'I see myself as an pro-environmental person'. These items were adapted from Van der Werff et al. (2013). Scores on these items could range from 1 (totally disagree) to 7 (totally agree). The environmental self-identity scale showed high internal consistency, overall, as well as in each case study area, therefore we computed the mean score on these items.

Worldviews

Worldview was measured with six items from the New Human Interdependence Paradigm scale (NHIP; Corral-Verdugo et al., 2008): 'Human beings can progress only by conserving nature's resources', 'Human beings can enjoy nature only if they make wise use of its resources', 'Human progress can be achieved only by maintaining ecological balance', 'Preserving nature now means ensuring the future of human beings', 'We must reduce our consumption levels to ensure the well-being of present and future generations', 'If we pollute natural resources today, people in the future will suffer the consequences'. Scores could range from 1 (totally disagree) to 7 (totally agree). The worldviews scale showed high internal consistency, overall, as well as in each case study area. We computed the mean scores on the worldviews scale.

Norms

General descriptive norms were measured with four items reflecting to what extent respondents' believed that a certain reference group acts pro-environmentally at work (cf. Ajzen, 2006): 'Most people who are important to me act pro-environmentally at work', 'Most of the people from my city act pro-environmentally at work', 'Most <Dutch/Italians/Romanians/Spaniards> act pro-environmentally at work', and 'Most people in general act pro-environmentally at work'. The four items for local descriptive norms were similar but referred to people at their workplace: 'Most of my subordinates act pro-environmentally at work', 'Most of my co-workers act pro-environmentally at work', 'Most of my supervisors act pro-environmentally at work', and 'Most members of my management team act pro-environmentally at work'.

We measured general injunctive norms with four items (cf. Ajzen, 2006): 'Most people who are important to me think I should act pro-environmentally at work', 'Most of the people from my city think I should act pro-environmentally at work', 'Most <Dutch/Italians/Romanians/Spaniards> think I should act pro-environmentally at work', and 'Most people in general think I should act pro-environmentally at work'. The four items for local injunctive norms were again similar, but focused on people at work: 'Most of my subordinates think I should act pro-environmentally at work', 'Most of my co-workers think I should act pro-environmentally at work', 'Most of my supervisors think I should act pro-environmentally at work', and 'Most members of my management team think I should act pro-environmentally at work'.

Personal norms were measured with 4 items based on Steg and de Groot (2010): 'I feel guilty if I do not act pro-environmentally at work', 'I feel morally obliged to act pro-environmentally at work, 'I feel proud when I act pro-environmentally at work', and 'I would violate my principles if I would not act pro-environmentally at work'.

All items related to norms were scored on a scale ranging from 1 (totally disagree) to 7 (totally agree). All norm scales showed high internal consistency, overall, as well as in each case study area Therefore, we computed mean scores of items included in the relevant scales.

Efficacy

The self-efficacy scale consists of three items: 'For me acting pro-environmentally at work is not costly', 'For me acting pro-environmentally at work is easy', and 'For me acting pro-environmentally at work is feasible' (cf. Ajzen, 2006), on a scale ranging from 1 (totally disagree) to 7 (totally agree). The reliability of this scale was good.

Outcome efficacy was measured by three items: 'I can make a positive contribution to the quality of the environment by acting pro-environmentally at work', 'Environmental quality will enhance when I act pro-environmentally at work', and 'I can contribute to reducing environmental problems by acting pro-environmentally at work' (cf. Steg& De Groot, 2012. All items were scored on a scale ranging from 1 (totally disagree) to 7 (totally agree). The outcome efficacy scales showed high overall internal consistency, overall as well as in most case study area. Only in the Dutch case study the reliability of outcome efficacy is somewhat lower. We created mean scores of the items for self-efficacy and outcome-efficacy.

Pro-environmental behaviour at work

We used two measures for pro-environmental behaviour at work. First, we assessed total energy use of relevant behaviours by asking participants about their transport related behaviour (commuting and business trips), and energy use at the workplace (i.e., their use of lighting, the computer, heating and air-conditioning). The following transport-related items were included: 'How many kilometres per week do you on average commute by car?', 'How many kilometres per week do you in average travel for work?', 'When you travel for work purposes, how often do you drive in an energy efficient way (looking ahead and anticipating on traffic and brake and accelerate quietly and change to a higher gear as soon as possible)?', 'When you drive for work, how often do you carpool rather than drive alone?'. To measure the energy use at the workplace we used for example the following items: 'How many hours a day are the lights on at your workspace?', 'How often do you switch the computer off at work when you go home?', 'What is the average temperature setting at your workspace when you are working?' and 'During the year when you are at work, how often do you turn on the air-conditioning at your workspace?'. We did ask for personal control over lighting, heating and air-conditioning. For the full energy use at work scale see Appendix section 1c. In collaboration with an expert in energy and sustainable research from the faculty of mathematics and natural sciences at the University of Groningen, we created a calculator to compute energy use on the basis of the answers provided on the behavioural items. We did this by assigning Mega joules used to each energy behaviour score (see Gatersleben et al., 2002). By summing up all these energy content scores we created a score for individual energy use at work which reflects the amount of energy used in MJ per week per person.

Second we measured self-reported recycling at work with three items: 'How often do you use recycled paper at work?', 'How often do you separate your paper from the regular garbage at work?', and 'How often do you use your own cup instead of disposable cups at work?'. Scores on these items ranged from 1 (never) to 7 (always). For some countries we also asked about separating plastic from the regular garbage. However, this item was not included in the recycling scale, because this question was not relevant for the Dutch sample as in the Netherlands plastic is separated at the waste disposal station, so workers do not need to do this themselves. We found weak correlations between the different types of recycling at work, as reflected in the very low reliability scores. This suggests that engaging in one type of recycling behaviour is only weakly related to engaging in other types of recycling behaviour. This may be due to the fact that different recycling regimes are in place for different types of recyclables in each of the case study areas. Therefore, we decided to run the analysis with the different types of recycling separately as well as with an overall score for recycling in general. As the pattern of results was very similar

for the different indicators of recycling behaviour, we only report the analyses with overall recycling behaviour as the dependent variable.

Pro-environmental behaviour at home

We measured pro-environmental behaviour at home in a similar way as pro-environmental behaviour at work. For the measure of total energy use we adjusted the items in such a way that they targeted the situation at home. We included items concerning transport, lighting, electrical devices, heating, air-conditioning, washing and bathing.

Self-reported recycling at home was measured with six items: 'How often do you use recycled paper at home?', 'How often do you separate your batteries from the regular garbage at home?', ''How often do you separate your glass from the regular garbage at home?', 'How often do you buy goods with minimum packaging?', and 'How often do you refuse plastic bags in stores?'. Again, we included an item on separating plastic form the regular garbage in some countries only, and therefore this item was not included in the recycling scale, for the same reason as in recycling at work. The recycling at home scales showed high internal consistency, therefore we computed a mean score of the items.

Results: testing theoretical models to explain environmental behavior at work and at home

We tested a theoretical model that integrated various individual factors, and predicted a causal chain from values, environmental self-identity, outcome efficacy and personal norms to behaviour. Testing the causal models of sustainable behavior in organizations allows for defining tailored policies that can target the most important factors that affect behavior.

More specifically, the model predicts that values affect behaviour indirectly, via a process of norm activation. It is assumed that values, and particularly biospheric values, affect strength of the environmental self-identity: environmental self-identity will be stronger when one strongly endorses biospheric values (Van der Werff et all, 2013; in press). Environmental self-identity in turn influences the perceived outcome-efficacy: those who think acting pro-environmentally is an important part of who they are more likely to perceived their own individual contributions to reducing environmental problems as worthwhile. This process will then activate personal norms, which are feelings of moral obligation to act pro-environmentally. Those with strong personal norms are more likely to act pro-environmental (e.g. Steg & De Groot, 2010). The full model is depicted in Figures 11.

We conducted a Structural Equation Model Analysis via AMOS to test this model for the different behavioural indicators. Since personal norms are not significantly related to energy use at work, we only looked at recycling at work. The model proved to be effective in explaining recycling at work (as shown by the index of goodness of fit: CFI= .930.) Considering the recommendations by Bentler (1992) and Hu & Bentler (1999), this model fits appropriately the data (see Figures 1 and see Appendix 1 for the full model). The results show that the proposed theoretical relationships are supported by the data; each variable is related to the next variable in the causal chain as expected.
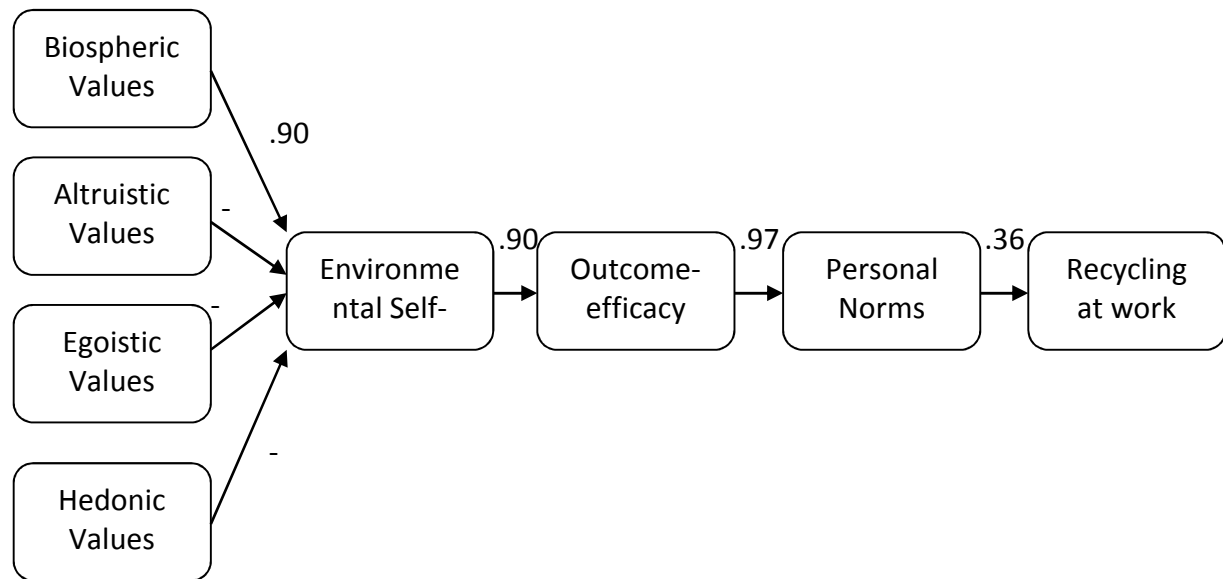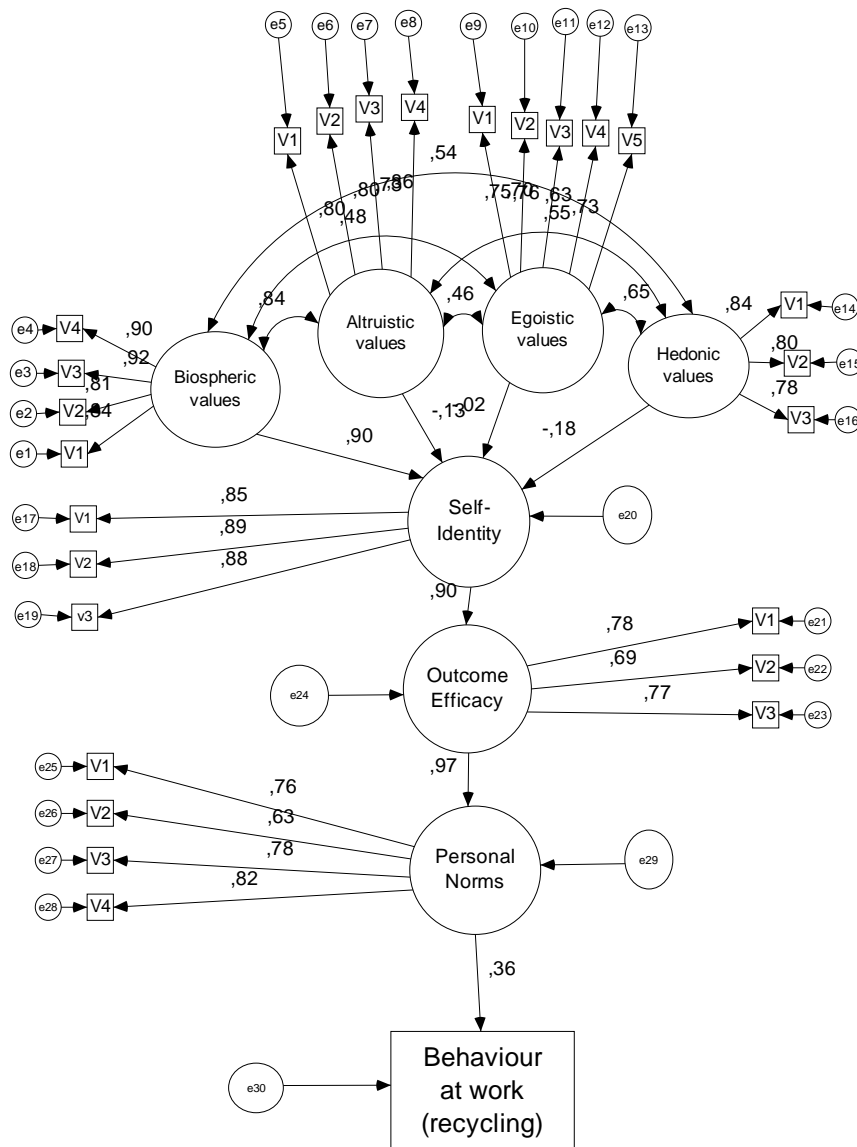
*Figure 11 Predicting recycling at **work**: The role of values, self-identity, outcome efficacy, and personal norms in the whole sample (4 case studies). CFI=.930. Numbers indicate Beta weights (standardized estimates), which mean the relative importance of a predictor in predicting the criterion. The larger the absolute value of the beta weight, the more influence this factor has on predicting the criterion.*

Discussion and conclusion

Our model predicted a causal chain from values, environmental self-identity, outcome efficacy, personal norms to behaviour. The theoretical model was supported by the data. Indeed, values, and particularly stronger biospheric values, were associated with a stronger environmental self-identity, which in turn was related to perceiving one's own pro-environmental actions as more effective in reducing environmental problems (i.e., a higher outcome efficacy). A higher outcome-efficacy in turn was related to a stronger feeling of moral obligation to engage in pro-environmental actions (i.e, stronger personal norms), which finally increased the likelihood of engaging in pro-environmental actions, in particular recycling at work. Personal norms were less predictive of energy use at work. Again, this shows that energy use at work is not strongly related to individual normative considerations, but probably more strongly depends on other factors, such as situational and organisational factors. This suggests that many different factors can be targeted to promote recycling at work, as targeting factors further up the causal chain is likely to affect factors further down the chain as well. Furthermore, our results show that behaviour is indirectly influenced by values (especially biospheric values) through the strengthening of the environmental self-identity, which influences the perceived outcome-efficacy and can activate personal norms. This implies that when one aims to target pro-environmental behaviour in the organization, the different factors in these models could be taken into account.

Apendix 1.

The role of values, self-identity, outcome efficacy, and personal norms in the whole sample (4 case studies). CFI=.930. Numbers indicate Beta weights (standardized estimates), which mean the relative importance of a predictor in predicting the criterion. The larger the absolute value of the beta weight, the more influence this factor has on predicting the criterion.

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Discussant Contribution

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Garcia-Mira et al. paper

The paper looks at the drivers and barriers around individual behaviors for changing practices or routines in consumption at work and at home. Three factors are identified, namely: knowledge, motivation, ability. While the opportunity to engage in new behavior comes into the argumentation, it is not fully differentiated. Four case studies, consisting of surveys, were carried out in Spain, the Netherlands, Italy and Romania. In terms of its results, the paper addresses values, which underlie a strong environmental self identity, which in turn determines or drives environmentally beneficial actions, such as recycling. The highlight of this paper is the causal relation between values and behavior, though this also raises the question: can a change in norms also result in a shift in values?

Critical questions for this paper concern both its methodology and analysis. Regarding the former, questions arise as to the choice of countries for the study, the common characteristics that make these case studies suitable grounds for research, and the types of organizations considered for each country. It could also be helpful to reflect on organizational values as a 'shadow value set' when examining individual case studies, e.g., an employee of Greenpeace and employee of Exxon or VW. Regarding analysis, though the focus of the study is on the 'self', it would be interesting to find what other factors relate to outcome-efficacy, such as opportunity, or to personal norms. A deeper reflection on 'peer pressure' could be equally interesting. Furthermore, this model could be used to display aspects and drivers of knowledge, in order to reflect on whether or not a 'knowledge society' engages in environmentally positive behavior. As a final reflection, the survey shows a willingness to engage in pro-environmental behaviour. This raises the question of how to tackle the discrepancy between the willingness-to-act and the actual behaviour.

Rauschmayer et al. Paper

The paper presents a very elaborate and critical review of transition management, practice theory and the capability approach. It not only presents the approaches, but also devises a reflexive take on them. A reconceptualization of the multi-level model is proposed form the perspective of practices. This conceptual stand gives grounds for insights into the governance of transitions, but does not shed light on the blind spots that were identified for transition management; it would therefore be important to tease out the implications of this model for them. The paper in its discussion of motives could gain from differentiating between transition management and community arenas, as well as between facilitated, guided or steered groups of actors and emergent initiatives.

Discussion Report

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There was a common link drawn between the two papers about transitions - Rauschmayer et al. defining transitions as fundamental changes in cultures, structures and practices - that take a long time to materialise and develop. From this point of departure, the discussions began with some points about the structures and how they enable change that might be a departure from the old structures thereby generating conflict during transitions.

Although the first paper provided a very insightful overview of Transition Management, Practice Theory and the Capability Approach, the point was raised that it seemed weak on relating the blind spots of TM with regard to change. What are the implications of the conceptual model presented to the blind spots? Therefore, drawing on the conceptual model presented, what are the suggestions for the various blind spots?

A second point related to the first paper regarded the evidence that, without the facilitation and transition management, do emerging initiatives and experiments ensure that these communities facilitate an effective process on their own? What are the capacities that differentiate these communities and underlie the practices of TM established networks and emerging initiatives?

The second presentation linked values and drivers and barriers for individual behaviour in the work environment focussing on knowledge, motivation and ability. As key factors for behaviour, discussions suggested the opportunity to engage could have been better discussed in the paper. The papers' strength rests in its conceptual framework backed by four case studies. Since values may lead to a shift in behaviours, the obvious question might be can a shift in behaviours/norms lead to new values?

A second point for the second paper was for clarification on the context of the work - how, for instance were the companies selected in the study? Organisational values might influence the type of employees who want to work there and their values. For example, an environmental NGO might consist of employees with relatively pro-environmental value set, whereas other organisations might draw employees with somewhat weaker environmental values. The selection of companies was broadly undertaken to try and minimise these biases.

There is general agreement for more space for discussions on blind spots across the conceptual framework with regard to power, normativity, and individuals and how this related to the question . How can a shift in behaviour generate shifts in norms and values?' There is more space for research here.

There was brief discussion about the definition of sustainability and its normative nature. While there are various interpretations, this discussion has previously been undertaken during the InContext project. Short follow-up discussions included the ideas of: the conventional three interlinked circles - economic, social and environmental - where economic growth typically becomes the priority; the biophysical limits approach, in which the social sphere is a subset of the biosphere and the economy respectively a subset of the social sphere; another approach might be the systemic one in which inter- and intra-

generational issues are key. At the same time, values are important, and the differentiation between social and individual can lead to a very complicated environment. Ultimately, sustainable development means little and remains a very elusive term. The idea that individual choice is confined by a decision making architecture well out of reach of the individual was also raised. Understanding how sustainability feeds into transition processes can be challenging. An overview of the debates on sustainability was circulated as an addendum[1].

The discussion on the second paper also touched on the matter of the survey measuring the willingness to act, versus the actual behaviour. This may be resolved by further research and experimentation and observation of behaviour, but this will be costly. For the meantime, observation and psychological research can help develop a certain level of trust in the responses.

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[1] B. Hopwood, M. Mellor, G. O'Brien, Sustainable development: mapping different approaches, Sustainable Development, 13 (2005) 38-52, http://onlinelibrary.wiley.com/doi/10.1002/sd.244/full .

2b

Self-organising versus facilitated pathway development: differences & similarities

A Complex Transition Perspective on Community Energy

Exploring the Dynamics of Community Energy from a Complex Transition Perspective

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Abstract

This paper aims to expand the transitions perspective on community energy both empirically and theoretically. So far, most transition studies of community energy are focused on analysing empirical examples in the UK from a socio-technical Multi-Level Perspective (MLP). This paper takes a 'complex transition perspective' to analyse community energy initiatives in four West-European countries (The Netherlands, Germany, Belgium and UK). The term 'complex transition perspective' refers to an assemblage of perspectives in the field of transition research that share a basis in complex system thinking and action research, also referred to as the 'systemic and reflexive approach'. The paper starts with 'fresh empirical observations' on community energy initiatives, describing drivers and barriers in the community energy initiatives, as experienced by practitioners involved. Subsequently, these empirical observations are considered from a complex transition perspective, specifying what the analytical implications are of taking such perspective, how this differs from the socio-technical Multi-Level Perspective, and what kind of implications it has for action research and policy regarding community energy initiatives and sustainability transitions.

1. Introduction:

There is an increasing attention for the role of civil society, grassroots initiatives and community-led innovations in transitions towards sustainability (Seyfang and Smith 2007, Middlemiss & Parish 2010, Seyfang & Haxeltine 2012, Smith 2012). A considerable amount of these grassroots innovation studies have an empirical focus on energy; the phenomena of community energy in particular (e.g. Seyfang et al. 2010, Hielscher et al. 2011, 2012, Hargreaves 2011) and the role of civil society and social movements in energy transitions more generally (Smith 2012, Seyfang & Haxeltine 2012). Many of these studies have employed the 'socio-technical perspective' on sustainability transitions as a theoretical framework to analyse empirical grassroots phenomena, including the strategic niche management (SNM) framework (Kemp et al. 1998, Hoogma et al. 2002) and the multi-level perspective (MLP). The MLP is one of the most central concepts in transition studies (Rip

& Kemp 1998, Geels and Kemp 2000, Geels 2005, Geels 2005, Smith and Raven 2012). The MLP distinguishes between different levels of functional aggregation; 'landscape' (macro), 'regimes' (meso), and 'niches' (micro). From a MLP-perspective, community-led energy initiatives and grassroots innovations are typically conceptualised in terms of 'niches'; protected spaces that enable and shelter radical innovation from the pressures of unfavourable socio-technical energy 'regimes'. A typical dilemma that recurrently appears in both empirical case-studies and theoretical discussions, concerns the mainstreaming of niches: 'as niche practices diffuse into wider society, they always evolve and change, losing some of the aspects that originally made them innovative and appealing to early pioneers, and gaining other characteristics that make them attractive and accessible to wider audiences' (Seyfang & Haxeltine 2012, see also: Smith 2006, 2007). One of the subsequent questions is how and to what extent one can enable niches – such as e.g. energy community – to 'scale up' or 'become more mainstream', while at the same time retaining their innovative potential (Smith 2006, 2007).

In this paper, we aim to *broaden* this transitions perspective on community energy, both empirically and theoretically. Empirically, we analyse case-studies of community energy initiatives in four West-European countries - the Netherlands, Germany, Belgium and UK – thereby aiming to move beyond UK-only studies which seems to dominate much of the community energy and energy transitions debate (Walker et al. 2007, 2008, 2010, Allen et al. 2010, Seyfang et al. 2010, Hargreaves 2011, Hielscher et al. 2011, 2012, Seyfang & Haxeltine 2012, Smith 2012). Theoretically, we move *beyond* the socio-technical multi-level perspective, by taking a **'complex transition perspective'** to analyse community energy initiatives. With the term 'complex transition perspective' we refer to an assemblage of perspectives in the field of transition research that share a basis in complex system thinking and action research. By coining and elaborating this perspective, this paper also has a more meta-level aim of addressing the state-of-the-art of transition research and raising some critical interrogations for future research.

The field of transition research has emerged in the past decade as a new interdisciplinary field that focuses on studying sustainability transitions: long-term processes of change towards more sustainable societies (Grin et al. 2010, Markard 2012). In the state-of-the–art book on *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*, a distinction is made between three main perspectives on transitions: 1) a socio-technical perspective (Geels & Schot 2010), 2) a systemic and reflexive approach (Rotmans & Loorbach 2010a) and 3) a governance perspective (Grin 2010).[1] With our 'complex transition perspective' we refer to the second category, i.e. the 'systemic and reflexive approach' and how this has developed in the past years. We call it 'complex transition perspective' because we believe this captures both the systemic and reflexive dimensions, as well as other dimensions that have been added over the years.

The **'complex transition perspective'** originates in a research tradition that combines transition management and complex system transition dynamics (Rotmans 2001, Loorbach 2007, 2010, De Haan 2010, De Haan & Rotmans 2011, Rotmans & Loorbach 2010a,b). This has been elaborated and refined with explorations on policy dynamics and environmental governance (Frantzeskaki & De Haan 2009, Frantzeskaki et al. 2012), linkages with socio-ecological resilience (Van der Brugge & Van Raak 2007, Van der Brugge 2009, Westley et al. 2011, Frantzeskaki 2011), urban transition management

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[1] There are different ways in which the field has been categorised. Markard et al. (2012) distinguish between 1) the Multi-level Perspective (MLP) (Geels 2005 2010), 2) Strategic Niche Management (SNM) (Kemp, Schot & Hoogma 1998, Smith & Raven 2012), 3) Technological Innovation Systems (TIS) (Hekkert et al. 2007,) and 4) Transition Management (TM) (Rotmans et al 2001, Loorbach 2007, 2010). We stick to the earlier categorisation as used in Grin et al. 2010

(Loorbach 2009, Frantzeskaki et al. 2012b, Wittmayer et al. 2012, Roorda et al. 2012, Roorda 2012, Van Steenbergen et al. 2012, Nevens et al 2013), power dynamics and (dis)empowerment processes (Avelino 2009, 2011, Avelino & Rotmans 2009, 2011) and the epistemological complexities of action research (Loorbach 2007, Avelino 2011, Wittmayer forthcoming). These different studies all draw on a variety of 'inter-disciplines', including complex system research, sustainability science, environmental governance and interpretative policy analysis. Considering this rich intellectual diversity, there is in fact no such thing as 'the' complex transition perspective (single), rather there is an assemblage of complex transition perspective*s* (plural).

The one thing that these various complex transition perspectives have in common, however, is that they start off from 1) **linking between transition dynamics and transition management** (i.e. how things 'are' understood and how they are, can or could be 'influenced'), and 2) **doing so at multiple levels, scales and time frames, always questioning the chosen system boundaries**. While the socio-technical Multi-level Perspective (MLP) (Geels 2005, Smith and Raven 2012) focuses on three specific *levels of functional aggregation* (niche, regime, landscape), the complex transition perspective argues that transition dynamics are an amalgam of many more multi-levelled dimensions. This includes multi-levels beyond and between niche, regime and landscape (De Haan 2010, Loorbach & Rotmans 2010a, Avelino 2011), multi-phases (pre-development, take-off, acceleration, stabilisation, Rotmans 2005, Van der Brugge 2009), multi-patterns (De Haan 2010, De Haan & Rotmans 2011), multi-level management (strategic, tactic, operational, Loorbach 2007, Frantzeskaki et al. forthcoming), and multi-scale (local, regional, national, transnational, global (Coenen and Truffer 2012). The ultimate challenge for complex transition perspective is to (re)consider how these multi-dimension dynamics relate to one another (Loorbach and Frantzeskaki 2012). In this paper, we will explicate what the implications are of taking such complex transition perspectives to analyse community energy initiatives, how this differs from the socio-technical multi-level perspective, and what kind of challenges this raises for future transition research.

We start this endeavour with 'fresh empirical observations' on community energy initiatives. Rather than starting off with a specific theoretical lens or analytical framework, we first describe the empirical case-studies in terms of drivers and barriers for community energy initiatives, as experienced by (some of) the practitioners involved. We then move to discuss how we can conceptually frame and analyse these empirical observations when applying complex transition perspectives. On that basis, we also formulate a number of hypothetical policy suggestions in the tradition of transition management. Last but not least, we summarise the main insights and conclusions, and identify challenges for future research.

This is an explorative paper; rather than testing predefined hypotheses, the aim is to formulate insights and hypothetical policy suggestions that can be verified, tested and further developed in future research and practice. We do not aim to 'generalise' what the main barriers and drivers for community energy 'are' from 'the' complex transition perspective; rather we focus on empirically observing what the participants in the cases themselves experience to be context-specific drivers and barriers in their respective initiatives, and subsequently discussing how complex transition perspectives may contribute to 1) understand these drivers and barriers and 2) empower practitioners that want to drive their initiatives forward, by suggesting how they might use complex transition insights to deal with the drivers and barriers of community energy in future endeavours.

2. Empirical Case-studies: Drivers & Barriers in Community Energy

Our analysis is based on eight empirical examples of community energy initiatives across four different countries: The Netherlands, Belgium, United Kingdom and Germany (see overview in the table below). These case-studies are part of an on-going research project that focuses more generally on the 'self-organization of infrastructure by civil society', by which is meant: the direct involvement of citizens, user cooperatives and/or non-governmental organizations in organizing, operating, and maintaining infrastructures (Avelino & Frantzeskaki 2012, Frantzeskaki, Avelino and Loorbach forthcoming). As such, cases that are not confined to energy *generation*; we also include community projects in Germany that focus on the *reduction of energy use*[2].

Table 1. Overview of Case-studies Community Energy Initiatives

National context	**Socio-spatial context**	**8 Projects/organisations**
Netherlands	Island Texel	Cooperative *Texel Energie* *
	Eco-district Eva Lanxmeer	Local company *Thermo Bello*
Belgium	Cooperative Movement	Cooperative *Ecopower* *
United Kingdom	Community Energy Scotland	Project *Urgha Wind*
		Project *Udny Community Wind Turbine*
Germany	Eco-district Vauban Freiburg	Passivehouse *»Wohnen & Arbeiten«*
		Co-housing *SUSI-project*
	Town Schönau/ Anti-nuclear movement	*Elektrizitätswerke Schönau (EWS)*

Our data-collection is based on qualitative research methods: interviews, document reviews and participant observation. A list of interviews is provided in Appendix 1.

In this section, we start by presenting our case-studies as fresh empirical data, in terms of first providing a basic description of the community energy initiatives and then describing the barriers and drivers within these case-studies, as experienced by some of the practitioners involved. We include original interview quotes about both the drivers and barriers, as well as about the national and institutional context. As such, the case-study descriptions are quite elaborate. Those readers who are impatient to get to the more theoretical analysis, are advised to start by reading the overview of barrier and drivers as given in table 2 under section 2.5, and/or to the analyses under section 3. When a specific driver, barrier or analytical comment raises questions, the reader can then 'move back' to sections 2.1- 2.4 to read the empirical background and detail behind the identified barriers, drivers and analytical comments.

2.1. The Dutch Cases

National context	**Socio-spatial context**	**Projects / organizations**
Netherlands	Island Texel	Cooperative *Texel Energie*

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[2] As we will argue in our analyses, these cases also provide interesting insights for a complex transition perspective on community energy.

	Eco-district Eva Lanxmeer	Local company *Thermo Bello*

2.1.1 Texel Energie

Texel Energie is one of the first and 'most famous' energy cooperatives in the Netherlands. It is geographically located on Texel, a Dutch island in the Wadden Sea (North Sea), which harbours 13.000 citizens spread over seven villages. *Texel Energy* is a cooperative with 3.000 members and 4.000 customer connections. One can become a member for 50 euros a year, for which one receives a share in the company, a discount on the energy price, and a vote in the annual assembly. Each member gets one vote, independent of the amount of shares. *Texel Energie* was initiated by three islanders and formally founded in 2007. Initially, the main business was to buy and resell renewable energy, but in recent years it also started producing renewable energy through projects in solar energy, bio-mass and 'anaerobic digestion', and it is currently working towards also investing in wind, geothermal and tidal energy.

One of the main **drivers** for *Texel Energy* concerns the local culture; the island of Texel supposedly has a very strong local identity and exceptionally strong cultural and historical strive for "being independent". A famous example thereof is the story of the company *TESO* – the ferry service that has connected the island to the mainland of the Netherlands for the last century. *TESO* is an abbreviation for *Texel's Eigen Stoomboot Onderneming* – literally translated as "Texel's Own Steam Ship Enterprise". Before *TESO* - until the end of the 19th century - the island was dependent on a commercial ferry company from the mainland. The story is that islanders were getting fed up with the increasing prices and decreasing quality of the ferry service. At the beginning of the 20th century, a small group of respectable islanders started an initiative that would enable the islanders to buy "their own steam ship". By selling shares of 5 to 25 Dutch guilders (2-12 euros), they managed to collect a total of 76.000 guilders (approximately 35.000 euro), and in the year of 1907, *TESO* commissioned the construction of its first steam ship. Today *TESO* still has over 3.000 shareholders. A ferry ticket to go to Texel is considerably cheaper (nearly 90%) than those to the other Dutch islands (which are offered by commercial ferry services). This historic tale illustrates the island culture of Texel, and *TESO* is very often celebrated and referred to as a model for island independence, also in discussions on renewable and sustainable energy. Our correspondent is not only a board member of *Texel Energy* but also born and raised on the island; he emphasized how important the local identity was, and that the need for independence was and is one of the strongest drivers for the success of *Texel Energie*, much more so than the environmental argument (interview nr. 8).

One of the main **barriers** for *Texel Energy* concern the newness of the business model, and-related to that- the difficulty of getting financed:

> *"It was new – we were one of the first of this type of initiatives in NL – we really had to invent everything ourselves. (…) [and another barrier is] financing, especially for production – the banks are very hesitant. We need half million, that is so much money… you cannot finance that with 3000 members. (…) It is especially the banks that create difficulties for us – because they don't know our model we have a very high risk profile" (interview 11).*

A related barrier that was mentioned concerned the confusion over the differences between for-profit, non-profit and not-for-profit:

> *"Our goal is to provide reliable and sustainable energy for our members, our main goal is not to make profit. We fall in between profit and non-profit, that can be quite difficult: we have to explain and explain it all the time. Many people and government officials do not understand it. A few years ago the TESO also had many difficulties explaining their way of working to the EU*

and to the tax offices. It would be nice to have the social enterprise legally recognized... now it does not exist legally" (interview 11).

Our correspondent did however nuance that the main barriers were not necessarily legal or regulatory: "we were not that bothered by laws and regulations. Of course there were some obstacles when we made contracts and so on – since our concept was new – but one should not exaggerate the legal obstacles" (ibid). Although "there is a lot of talk about getting rid of laws and regulations", our correspondent also warned against the falling in the trap of a legalistic discussion:

"There is a lot of talk about getting rid of laws and regulations. We do have a lot of laws and regulations, but they are not there for nothing. We should deal with those laws and regulations more creatively … and be careful not to blame everything on regulations. We should particularly be careful to say that we need to get rid of legal barriers. You should check out this whole discussion about the electricity law – there are endless discussions about everything. It is very difficult to pinpoint what are the exact legal barriers that can be abolished. Rather we should stop thinking in terms of barriers and think more in terms of opportunities. We [Dutch] think in terms of limitations and not in terms of possibilities. If you ask a farmer how high his barn will be he will ask "how high is allowed to be" and then if one sais 6 meters, the farmer will say he wants 6,5 meters". (interview 11)

When asked explicitly about the interaction with government, our correspondent answered that "there is no interaction with government – we consciously choose not to involve them" (ibid). Although the interest of government officials for local energy initiatives has considerably increased in recent years, our correspondent doubts the usefulness of government involvement and facilitation.

Another correspondents emphasized that recently there has been a bewildering amount of departments and organizations enthusiastically 'jumping on top of citizen initiatives' and commented that all this attention is not always particularly helpful:

"Now government officials all over us and other initiatives (…) they made a mess of (un)sustainable energy themselves and now they see all these nice citizens initiatives and they want a piece of it. Would it not be nice if we could simply leave it up to citizens? Government should learn to let go of what they can let go" (…) "there is [also] a bewildering amount of [civil society] organizations (…) who approach [us] for meetings, interviews and so on (…) they all want to do something with local energy: it is a hot item the last few years. I cannot cope with it all – and it is amazing how much double work occurs - I often get the same questions from many different people" (confidential).

2.1.2 Thermo Bello

The second empirical story revolves around *Thermo Bello*, a local energy company that is part of the eco-district *Eva-Lanxmeer*. The eco-community *Eva-Lanxmeer* includes around 250 houses and is located within the Dutch town of Culemborg. Since 2009, *Thermo Bello* is operational as the producer, network operator and supplier of district heating for *Eva-Lanxmeer* via a geothermal water heat pump, servicing a total of 180 private homes and 8 utility buildings (e.g. school, office complex, etc.). *Thermo Bello*'s heat pump is connected to the water pump owned by *Vitens*, the regional company that supplies *Eva-Lanxmeer* with drinking water. This arrangement originates in a contract ("raamwerkovereenkomst") that was made in the year 2000 between: 1) the water company *Vitens*, 2) the council of Culemborg, and 3) the residents' association ("bewonersvereniging") of *Eva-Lanxmeer.* In this contract, the three parties made agreements regarding the development and exploitation of district heating, including

ecological targets. In 2006 *Vitens* decided to divest the heating supply, and the local government refused to take over. This is why and when the residents' association of *Eva-Lanxmeer* was asked to take over (interview 1 & website Thermo Bello). *Thermo Bello* has the ambition to become a full-fledged energy company in the future, including solar energy, wind energy and possibly biogas "in order to prepare for a period in which we will not depend on fossil fuels at all anymore" (ibid).

So far *Thermo Bello* has formally operated as a Limited Company (Ltd.) with the three founders functioning as directors (all residents of *Eva-Lanxmeer*). This is a temporary arrangement; the aim is to eventually place the Ltd. under a non-profit foundation with considerable decision making power, including a 'working group' of *Eva-Lanxmeer* residents. When asked why the initiators prefer this combination of legal forms (rather than e.g. a co-operative) our correspondent answered that this choice was made "in order to safe-guard decision-making capacity… if you have the whole neighbourhood deciding you cannot make progress as an entrepreneur" (interview 1).

One of the main **drivers** for the *Thermo Bello* company seems to be its embeddedness in *Eva-Lanxmeer's* eco-oriented housing community. Not only did the very existence of this community provide the origin of and possibilities for the foundation of *Thermo Bello*, some of the residents of *Eva-Lanxmeer* are also involved as volunteers in measuring and maintaining the heating facilities (ibid). Our correspondent emphasized that government and politics are incapable of taking action or at least far too slow, and that therefore citizens need to take action themselves, supported by government (ibid).

In terms of interaction with the government, *Thermo Bello* has mostly been supported by local and regional government. Although the council did not want to be involved in taking over the heating supply from company *Vitens,* the council did provide a guarantee to support the take-over by the association of residents, which was an important initial drivers (ibid). Moreover, *Thermo Bello* also received a subsidy from the regional government (*Province Gelderland)* to improve and extend the underground infrastructure needed for the heating supply.

Regarding **barriers and challenges,** our correspondent emphasized that a major bottleneck is formed by the "approaching national heating law", which aims to regulate heating supply in terms of price-caps and mandatory licenses. According to our correspondent, this law is supposed to protect citizens from large energy companies, but mean while the result is that the small local energy companies cannot survive because they cannot compete with large companies (who can afford lower prices):

> [This law is] *"a bureaucracy that aims to protect consumers; but we as local energy companies are the victims. The irony is that we ARE the consumer… we want to do it ourselves, but the government says 'that is not allowed, because we decide what the logic should be' (…) I really worry about this because the gas and energy prices are going to rise and the laws and regulations about heating prices will depend on the gas price. This means that we [Thermo Bello] will also have to base our energy prices on a global casino… We get stuck in a bureaucratic mill that does not allow us to take our own responsibility"(interview 3).*

In conclusion, our correspondent emphasized that national Dutch government is "not at all supportive to these sort of [local, citizen-led] initiatives. They want to have new types of infrastructure, but they want to hold on to the same rules (…) they are still based on an old model of the monopolistic enterprises" (ibid). Moreover, our correspondent argued that the Dutch focus on and vested interests in its natural gas resources limits the opportunities for renewable energy technologies (interview 3). It is indeed no coincidence that this phenomena – i.e. the presence of a natural resource limiting investments in alternative economic developments – is widely known as 'the Dutch disease'.

2.2. The Belgian Case: Ecopower

National context	Socio-spatial context	Projects / organizations
Belgium	Cooperative Movement	Cooperative *Ecopower*

Ecopower is an energy cooperative in Belgium, which aims to 'to collect funds for renewable energy projects from as many members as possible' (website *Ecopower*). Founded in 1991, it has grown to an organization with 36.855 members at the end of 2011 with an average of 4,3 shares per individual member (one share costs 250 euro) (*Ecopower* 2012). Each member gets one vote, independent of the amount of shares. Since 2003, *Ecopower* also sells energy to its members (electricity and more recently heating). In 2011, *Ecopower* produced nearly 30 million kWh of renewably energy, owing a total of 11 wind turbines, 3 hydroelectricity stations, 1 biomass installation and 270 solar cell installations (*Ecopower* 2012).

One of the main **drivers** for the *Ecopower* organization concerns the 'co-operative movement'. The co-operative movement refers to a transnational network of co-operatives and networks organizations that aim to promote and spread the co-operative philosophy of solidarity economics and not-for-profit enterprises. The *United Nations* proclaimed 2012 to be 'the International Year of Co-operatives', which is understood as "an acknowledgement by the international community that co-operatives drive the economy, respond to social change, are resilient to the global economic crisis and are serious, successful businesses creating jobs in all sectors" (http://www.2012.coop/). UN Secretary General Ban Ki-moon stated that "co-operatives are a reminder to the international community that it is possible to pursue both economic viability and social responsibility". One of the interviewed board members of *Ecopower* is also a board member of the organization *Rescoop Europe* (a federation of groups and cooperatives of citizens for renewable energy). Both the board members emphasized that *Ecopower* was strongly embedded in the cooperative movement, more so than for instance in the environmental movement (interviews 5&6). In relation to that, representatives that speak on behalf of *Ecopower* consciously stress issues such as citizen participation, local economy, independence, economic security and solidarity, more than pure environmental arguments: "we increasingly talk more and more about money and local economy, more than about kilowatt hours, emissions and environment" (ïbid).

Another **driver** for *Ecopower* has been the liberalisation of the energy provision market; "this [possibility of selling energy] is one of the main factors that has enabled the organisation to grow... especially those co-operatives that are not only producers but also suppliers of energy are growing in Europe" (ibid). Also a driver for *Ecopower* concerns the legal recognition of the organization as being a not-for-profit social enterprise. Amongst other things, this legal status enables member shareholders to receive a tax redemption of 180 euro per year. The other side of the coin is that the shareholders' profit is legally limited to 6%. When asked whether this was considered to be a barrier/limitation, the board members emphasized that -on the contrary- this limitation helped to safeguard the main goals of the organization, as also stated on the website: "This is not necessarily a limiting factor. On the contrary, it creates possibilities, as the financial surplus can be used to finance less profitable projects. Moreover, 6% is a good rate of return considering the current interest rates applicable to savings accounts" (website *Ecopower*). In the interview it was also stressed:

> *"we want to make kilowatt hours for our people... we do not want them to make money... we want to safeguard their energy supply for the future... so our product is renewable energy for our*

people. Those 6% that we provide in profit; that is not our [main] product: our product is not a financial product but kilowatt hours" (ibid).

When asked about interaction with the government, *Ecopower* representatives narrated how back in 1991 – when the co-operative was founded – "there was no space for renewable energy", and that the organization initially invested a great deal of time political lobbying (e.g. through the *ODE* – Dutch abbreviation for 'Organization for Sustainable Energy') (interviews 5&6). Also nowadays *Ecopower* is actively involved in political lobbying, such as recently a campaign regarding wind power: "currently it is possible for one person to buy the property rights of the wind… we want to claim the wind for the citizens… the wind belongs to everybody… we want to decouple the use of the wind from private ownership" (interviews 5&6). Regarding cooperation with the government, *Ecopower* emphasizes that their method of working is especially suitable for cooperation with city councils. For instance, *Ecopower* cooperates with the city of Eeklo as follows. After the city council had selected three sites for windmills and formulated specific environmental and social criteria, a total of seven companies competed for the right to construct and operate the windmills. Ecopower won the competition:

> *Ecopower-Eeklo: successful cooperation with a city council. (…) Thanks to an explicit information strategy and campaign – a shared initiative of Ecopower and the city – the inhabitants of Eeklo are well informed and very supportive of the project. Moreover, they are convinced of the windmills' potential and many have purchased shares in Ecopower, shares in what are now 'their' windmills. (website Ecopower)*

Representatives of *Ecopower* stressed the importance of having more and further reaching council decision regarding land expropriation and sustainable procurement, but also acknowledged the political sensitivity of such public decision-making. According to *Ecopower* and *Rescoop* representatives, Belgium lags behind compared to Germany and United Kingdom, both in terms of renewable energy as well as the cooperative movement:

> *"There is no organization that unites the cooperatives … in Flanders we ourselves have founded [the organization] Coopkracht… but it is only after 4-5 years of voluntary work that we are now thinking about employing someone to run this organization. A strong federation as they have in the United Kingdom and Germany, we do not have that here." (interviews 5&6).*

As for energy policy; back in 1991, the green lobby in Belgium proposed the German model of the feed-in-tariff. This was not accepted by the Belgian government, which instead implemented the system of 'green energy certificates'. Currently however, the Belgian government is considering implementing a new approach that resembles the German model of the feed-in-tariff. As a result:

> *"it is actually a very instable investment climate. When you compare it with Germany – there it is very stable… Stability leads to investments which in turn leads to employment; that is something that we cannot say about Belgium, Flanders and Wallonia" (ibid).*

Also there here are hardly any concrete plans to realise Belgium's EU commitments regarding 20% renewable energy by 2020; "there is not even a task division made yet between Wallonia and Flanders" (ibid). When dealing with Belgium, we have to remember that we are dealing not only with a federal government at the Belgian level, but also with subnational governments of the different regions of Flanders and Wallonia/Walloon. There are considerable differences between them when it comes to policy-making. For instance, regarding the wind ownership campaign mentioned earlier: Wallonia has already decided that each wind project is obliged to offer participation to citizens for 25% and to local governments for 25%, while in Flanders they are still discussing legal issues (ibid).

2.3. The UK Case-studies

National context	Socio-spatial context	Projects / organizations
United Kingdom	Scotland Energy Community	Project *Urgha Wind*
		Project *Udny Community Wind Turbine*

Scotland is a breeding bed for community projects including a large number of community owned energy projects. We start our research for the UK energy context with the two frontrunners in community energy, Urgha and Udny Community Wind (. During the scoping of the UK case-studies, representatives from the Scottish government and from Community Energy Scotland suggested Urgha and Udny as successful cases that "survived and succeeded in an unfriendly institutional landscape." As a result, the exploration of these two case-studies reveals institutional barriers and opportunities faced by the two frontrunning communities when community energy in Scotland was in its infancy. At present, the institutional context has changed with a Scottish Strategy about Community Energy explicitly stating conditions and targets for energy sufficiency and self-reliance.

2.3.1 Urgha Wind Project & The North Harris Trust

Urgha Wind is a community owned wind turbine by the North Harris Community Trust in UK. At a community recycling site, a community group was established in 2003 so as to set up projects that benefit the larger community. North Harris is a sparsely populated area and the community consists of 700 inhabitants. At the beginning, the community recycling site was contracted by the city council. The resources needed to support a healthy community economy however could not be covered by council's support. Hence, they erected a turbine (10KW wind turbine) that generates electricity (that converts to heat and light) and the excess/surplus of electricity generated not used by the community is fed into the grid. The turbine generates 4000 pounds/year of income. The primary objective of operating the wind turbine is to support job creation. Adjacent to the turbine's location is a small business district/area. There is a future plan to erect a second turbine.

A recognised and experienced barrier for Urgha Wind is the ***risk aversion of banks*** when it concerns loans for communities rather than private energy investors. Even though there are funds available and favourable conditions in loan packages for community owned energy projects, the majority of the banks are risk averse and avoid lending to community organizations. Given the changes in the funding schemes, grant funds are not anymore available for community energy projects; therefore if one wants to benefit/apply for feed-in-tariff, different sources of funds need to be explored such as commercial landing, private funding. This brings new barriers given that community projects are seen as of high-risk from banks making them reluctant to grant loans to community initiatives. Another risk to be considered is the **financial viability risk** of the Community's Trust. In the case of North Harris Community Trust, since the erection of the turbine, the company went bust so the wind turbine was not fully installed (monitoring equipment was not installed). The turbine was operated and generated electricity even without seizing its full design potential. The Trust had to find new sources of money so as to finalize their project.

Additionally, the community trust had to compete for loans and grants with private energy operators in an open market. A tough lesson taught was that in the beginning, commercially owned projects overtaking benefits due to their scale and better marketing-devised strategies. This however changed due to the support given by Community Energy Scotland (see following section).

At the same time, the enforced feed-in tariff scheme creates extra complications rather than an enabling environment for community energy. For the North Harris Community Trust, the grant fund that was awarded to cover the first three years excluded the community operators to apply for and as such, benefit from the feed in tariffs. Another complication concerns the benefit-holders of the community owned energy projects. The existing Planning Law does not specify about the beneficiary of community-owned energy projects (who get the benefit); a fact that creates accountability issues within the group from the community who operates the wind turbine and the community as a shareholder of it.

The **time** that it required from the proposal stage to the operation of the wind turbine creates additional hurdles due to the group stamina it requires to deal with the uncertainty and the ad-hoc demands that were created given that the community groups undertake these activities at voluntary capacity.

2.3.2 Udny Community Wind Turbine in Aberdeenshire

The Udny wind turbine is owned by Udny Community Trust that is a community founded and owned organization. It started with five members of a community (professional engineers and farmers) that showed interest in community energy in order to generate income for the local community. Udny Wind is a leading community project in Aberdeenshire. The installation of wind turbines by the community exemplified how to work towards the outcome for the follower communities.

In the case of Udny wind, a helpful condition was the fact that the local council officers welcomed the idea of a community owned wind turbine and were as helpful as they could to the community group. The council officers recognised that there is demand by community for facilitation and advice and respond to it by working in partnership with community to establish energy projects; they remained available and open to communicate and interact with the community throughout the project cycle.

A barrier faced by Udny community wind was the incompliant funding possibilities. Udny Community Trust where the rewarded 400,000£ by the national development fund have to be declined since they are considered as double funding after having been granted a bank loan with favourable conditions.

2.3.3. Energy Communities in Scotland

A common feature in the Scottish context is the willingness and tendency of communities to strive for self-sufficiency and independence, an aspect also present in the energy sector. The establishment of a mediating organisation – Community Energy Scotland, with the task to enable communities to undertake initiatives, further reinforces this cultural aspect and aims at succeeding in having community owned energy projects. After the energy strategy by the Scottish government, there were 200 villages that subscribed for community owned projects. The Scottish government responded to this demand by forming a consultancy/support group to aid these villages to become more energy efficient. Community Energy Scotland started as a Highlands and Islands Enterprise and in 2002 changed into the structure that operates today. It shifted from a government-based organization to an economic aid based organization. The different community groups elect directors and members of Community Energy Scotland.

Community Energy Scotland currently is a non-profit organization that helps communities to initiate proposals for community energy projects and to seek support from local authorities. Its role is to empower group initiatives and to respond to community requirements for initiating such projects. Development officers are now placed all around

Scotland to assist communities. It also functions as learning diffusion channels: (a) they transfer lessons learned from operating successful projects (b) good practices and lessons from the interaction between community and banks or other funding

Community Energy Scotland helps communities during the first phase to conduct a report, a feasibility study and to put together a planning application that complies with the Community Renewable Scheme (CARES) of the Scottish government. The process is transparent and adaptable to community requirements and capacity. Different types of support are available: internet sources, publications, general information, RE-toolkit, community-energy toolkit, mentorship program (with one-to-one consultations) training events (on demand and regular) and a practitioners-community conference. organizations (e.g. corporate actors). Recently, the initiation grand for community energy projects is a loan scheme of 150,000 that covers 90% of the funding. Communities seek funding from a number of resources such as private and commercial sectors. The requirement is that 20% of the total cost has to be matched by community's resources. A way to ensure this and to succeed in matching resources is to establish a community share scheme.

Community Energy Scotland is involved in different types of community projects and initiatives such as: (a) community-buildings, where advice is provided in one-to-one basis (via phone talks and consultation) about energy efficiency in community buildings and other broader needs (b) communities generating profits, and the profit is given to the community for benefiting its welfare and wellbeing (not utilized by one person or limited few) (c) community paradigm program where 30 groups are involved in a networking project sharing an agenda for locally produced food so as to reduce carbon footprint of the food chain.

2.3.4. Scotland and the UK

Scottish government and the UK government have positioned energy sufficiency high on the **political agenda**. This is a strong driver for all energy related projects. More specifically, there is a clear direction from the Scottish government to realize the energy ambition of the region to become energy independent mapped out in the Strategy for Energy Scotland ("Energy Roadmap 2020"). Clearly defined targets within the Energy Roadmap 202 are considered useful by different stakeholders because they provide legitimacy, (constitutional) support and an institutional stepping-stone for mechanisms and venues to gain support (financial, policy and organizational). Wind-projects owned by communities were promoted and prioritized as action plans for communities to be energy self-sufficient and financially profitable. Economic development and benefits for communities were triggering motives also communicated by council and government.

In addition to this, the Scottish government provides ***financial incentives*** for promoting energy projects in Scotland. Existing financial motives include the feed-in tariff and low interest rate loans and the national lottery fund. Grants from councils cannot be used; available grants include the lottery fund, LEADER EU Initiative (EU rural development funds) and loans to support community projects. An office and project for corporate investments on renewable energy is the Energy4All office.

An additional enabling factor is the ***availability and mobilisation of resources (time and personnel) for community capacity building***. At present, Aberdeenshire council has an office and appointed officers that provide advice to small businesses and households about energy installations and measures for energy efficiency. Resources were made available for having pilot projects with small-scale energy projects. The councils have seminars to disseminate information and in this way to create and educate the community

with the goal to create/grow the demand side. Seminars targeted housing associations and neighbourhoods for introducing district-heating installations.

A technological and financial barrier common to all community energy initiatives in Scotland is the grid coverage and connection cost. **Grid connection** in remote locations is limited and when available, grid connection cost is a hurdle. After the mediation of Community Energy Scotland, grid operators are invited in community consultations to inform community groups about future (planned) grid operations and installations. Investments in the grid for grid expansion are however not planned and scarce. At the same time, for communities that want to have their energy project, they face the difficulty of grid disconnect. The choice lies at the community's hands to upgrade the grid on their own cost (an amount of approximately 500,000 pounds, based on 2011 estimates and information) before installing any green energy technology. The grid operating company enjoys a monopoly and their interactions with community (when are not mediated by Community Energy Scotland) are slow and not open to information sharing and to creation of informal routes for cooperation (interview 13).

2.4. The German Case-studies

National context	Socio-spatial context	Projects / organizations
Germany	Eco-district Vauban Freiburg	Passivehouse *»Wohnen & Arbeiten«*
		Co-housing *SUSI-project*
	Town Schönau/ Anti-nuclear movement	Company *Elektrizitätswerke Schönau* (EWS)

2.4.1 Community Housing Projects in eco-city Vauban

Vauban is a district in the German city of Freiburg, renowned world-wide for its eco-oriented and participatory approach to urban planning, which started in the 1990s. A short description of the history and characteristics of Vauban can be found in Scheurer and Newman (2008). The Vauban district is planned to accommodate housing for 5.000 inhabitants and 600 permanent jobs, and was presented as German Best Practice at the 1996 UN Habitat II conference. In terms of energy, Vauban has a neighbourhood-scale combined heat and power station, fuelled primarily with waste products from the nearby Black Forest. This solution has been the result of "local advocacy groups [that] lobbied long and hard for a combined heat and power plant specific to Vauban to allow a much higher scope of self-determination about the district's energy supply (Lange, 1999; Steimer, 1999)" (Schreuer & Newman 2008:7). On the demand side of energy, Vauban is known for its passive houses and plus-energy houses. Already before Vauban, the council of Freiburg had pioneered a city-wide low-energy building standard in 1992 (which was later implemented at the federal level in Germany). However, through the many ambitious and innovative projects in passive houses and plus-energy houses, Vauban has moved 'beyond' this legal standard. According to one of our correspondents – the council has mean while decided that from 2011 onwards, only passive houses can be built for residential buildings.

Another distinct feature of Vauban is that a substantial part of the housing supply is organized by resident cooperatives, in contrast to commercial developers or centralised housing corporations (ibid). This decentralized housing supply resonates with the overall

influence of participatory ownership and planning, which plays and important role in Vauban:

> *"… the most significant factor in enabling the Vauban model to be developed was the use of the PCP process – a public-community-partnership set up with Vauban Forum. This enabled the sustainability goals to be achieved with both technical and social innovation (…) Such decentralisation in energy production and distribution goes hand in hand with the goal of the Distributed City. (…) The PCP model is a process for creating the distributed city". (Schreuer & Newman 2008:13)*

We interviewed residents from two different housing community projects: 1) the *SUSI-project* (interview nr. 14) and 2) the *Passivehouse »Wohnen & Arbeiten«* (interview nr. 12). Our correspondent from *»Wohnen & Arbeiten«* was also an active member of the public-community-partnership *Vauban Forum*.

The *SUSI-project* combines student housing and social housing. The name *SUSI* comes from *Selbstorganisierte Unabhängige Siedlungs-Initiative*, German for 'self-organized independent settlement initiative'. The project accommodates 250 residents, spread out over 4 buildings, a space for 'bauwagen' (self-made trailers) and two grass plots (interview 14). The project is 'self-organized' in the sense the property is owned by an organization whose members are also the residents. To be more precise – the residents formed an association, and this association in turn founded the company that owns the property. This is done in cooperation with the German 'Mietshäuser Syndikat' (literally translated as 'syndicate of tenement houses'), a syndicate that was founded in 1992 in order to facilitate self-governance in the housing sector. This particular legal arrangement serves to ensure that the property cannot be resold on the commercial market[3]. In terms of energy, the *SUSI-project* itself is mostly focused on the demand side, in terms of saving energy in the demolition and construction of houses and retrofitting houses with various isolation materials (website *SUSI-project*). Furthermore, our correspondent reported that the *SUSI-project* receives it electricity from the energy company *Elektrizitätswerke Schönau (EWS)* and elaborated on the reasons why (see next section 2.5).

The *Passivehouse »Wohnen & Arbeiten«* was constructed between 1998 and 1999 as one of the first passive houses, and is often mentioned as an exemplary project in terms of its innovative heating and sanitation solutions. It reduces primary energy use by 79% for 7% extra building cost compared to a conventional new building, and it is argued that the energy cost savings can pay off the 7% extra cost in 10 to 20 years (website *Passivehouse »Wohnen & Arbeiten«*). The remaining power needs are met by "solar thermal collectors and PV panels, and an on-site micro-CHP plant" (Antonoff 2007).

When asked about the interaction with government, our correspondent reported that the *Passivehouse »Wohnen & Arbeiten«* project – and the *Vauban Forum* initiatives more generally – were both hampered and facilitated by the local government. The main **barrier** mentioned was that at the time when the projects were started, the process was new for the administration, and that as the result of that, the administration was "sceptical to hand over power" to the citizens: "every single good idea that was brought up by citizens was criticized, slowed down, doubted and sometimes hindered by city administration" (interview 12). Citizens did however in the end manage to convince the city council on several urban planning decisions (e.g. location for the market place and position of car garages outside the district), but it often took several years of lobbying to convince the council. Regarding the development of sustainable energy in Vauban, another barrier that was emphasized during the interview was the limited image of co-generation:

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[3] Based on information from interview nr. 14 and also the description provided by the website of another housing community project: http://projekt-eschenhof.org/English/Concept

"co-generation is completely ignored by politicians and energy companies (…) co-generation is mostly hampered by the centralized paradigm (…) grid companies know that they will never be able to compete with decentralized energy" (ibid).

As a **driver** for bottom-up sustainable initiatives in Vauban, our correspondent indicated that – despite of the hampering aspects of the local bureaucracy – there has been considerable support from political council members:

> *"The Green Party is the biggest faction in the city for years.… Especially council members often help a lot, especially [member x] from the Socialist Party and [member x] from the Green Party (…) Political council can be helpful, but the bureaucratic administration less so: they cannot be creative… because if something goes wrong the person gets blamed by the administration and the public. Therefore they often downplay good ideas, or water it down…" (interview 12).*

Another driver that was mentioned concerns the persistence of the citizens involved. Our correspondent emphasized the "seriousness, boldness and perseverance" of *Forum Vauban*, as well as its professional approach in for instance speaking to the press (which were often in 'their favour'). One of the secrets of Forum Vauban was:

> *"we tried to infiltrate the council and contact each council member… (…) we were often discouraged, we often heard 'no'… but then we investigated why they say no and discovered that there were no unovercomable obstacles (interview 12)".*

When asked whether the main driver for *Forum Vauban* was this persistence of the citizens involved, our correspondent answered: "yes, but we also had the feeling that our voice would count; the behaviour of the council was giving us hope" (ibid).

Last but not least, another important driver for the projects in Vauban concerns the existence (and legal recognition) of the earlier mentioned housing cooperatives or 'Baugruppen' (literally: building groups) – in which groups of citizens act collectively as self-governed developers. In addition to the collective ownership of a building (the most common association with a co-housing arrangement), the Baugruppen also enable citizen collectives to actually design and construct the buildings on their own terms. According to our correspondent these Baugruppen are 'booming' in Germany because "people are starting to see that they can save money this way" (interview 12). The earlier mentioned council's decision that from 2011 onwards, only passive houses can be built, was mentioned as a positive driver for the collective 'Baugruppen' because "private citizens do not have the money for the initial additional construction costs, commercial developers don't care… so then we decide to build in groups [Baugruppen]… it is financially more attractive" (ibid).

2.4.2 Elektrizitätswerke Schönau (EWS)

Elektrizitätswerke Schönau (EWS Schönau) is a renewable energy provider (99,6% renewables and 0,4% cogeneration in 2010) that serves 135.000 electricity users and 8300 gas users across Germany, and in addition has subsidized a total of 2150 electricity production equipment units amongst its customers, including solar units, cogeneration units, biogas and hydraulic power units (EWS Schönau, 2012). Since 2009 EWS Schönau has become a cooperative, because they argued that "it is the most democratic and transparent way to organise ourselves" (interview 15). At first there were 650 citizens from Schönau, who put money together to buy the local grid. At the end of 2012, the cooperative had 2700 members coming from all over Germany (interview 15). Recently, EWS has become involved setting up other cooperatives across Germany, such as EVTN, a new cooperative in Titisee-Neustadt. EWS took a 40% share in EVTN with the commitment that a quarter of the revenues of those shares will go into setting up new cooperatives (interview 15).

One of the main **drivers** for EWS lies in its historical roots in the anti-nuclear movement. In the aftermath of Chernobyl in 1986, a parents' initiative[4] emerged in the small town of *Schönau* to protest against nuclear energy. They didn't want to wait until the government or energy companies would act, but started themselves. After 10 years of protest and debate with the local grid operators, the citizens in 1997 'took over' the grid and Schönau's community's supply from KWR (now called Energiedienst, a daughter company of one of Germany's four largest energy suppliers EnBW). Still, rebelling against the large four energy companies is an important focus of EWS: 'EWS fights against those forces that want to stop the Energiewende' […]'The four big energy companies that are losing market share when people start producing their own energy; they hamper the Energiewende.' (interview 15).

With this EWS plays into a strong sentiment amongst German citizens. One of our Vauban correspondents describes *EWS Schönau* as "the best known and most famous example so far – it tried to break the monopoly of big energy companies – this was very difficult… but they went to court and won in the end. They got the most sustainable electricity provision in all Germany" (interview 12). Our other Vauban correspondent said the following regarding *Schönau EWS:*

> *"I went to one of these anti-nuclear power events and there I met people from Schonau. I am very impressed by their independence and courage to organize themselves and do what feels good for themselves. It feels very good to get electricity from them and not from a corrupt company that sells cheap energy." (interview 14).*

This leads to the next driver: the ambition to make the energy supply more democratic. EWS grew out of the idea that citizens are too dependent on an oligopolistic energy supply. Developing decentralized sustainable energy is seen as a way to make the energy more democratic: 'Involvement of citizens is very important (…) not only for investing, but also for their voices. In that way we democratize the energy supply.' (interview 15)

A third driver spurring the growth of EWS is the liberalization of the energy market, which made it possible for EWS to supply energy across the country. 'First we thought it would be a threat, but now it's a big help, because it increases the reach of EWS to all over Germany.' (interview 15)

The first big **barrier** for EWS was to overcome resistance from KWR and convince the people of Schönau to buy the local grid. One of the blocking strategies by KWR was to ask a very high price of 8.8 million DM for the local grid, while a taxation requested by the citizens of Schönau provided a number of 3.8 million DM. In response the citizens found sponsors all across Germany to pay KWR's price. 'If we would have gone to court over this, it could have taken years, therefore we decided to collect donations to fund the difference and go to court after buying the grid' (interview 15). In the end two referenda were necessary to be able to buy the grid from KWR.

Another barrier relates to EWS being different from mainstream energy companies. This makes EWS a difficult case for the regulator:

> *'Since we started cooperating with cooperatives that want to buy back their grids the Bundesnetzagentur (BnetzA)[5] starts to make trouble and they send the Bundeskartellamt[6] at us. The BnetzA sets the criteria according to which local municipalities should decide who can*

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[4] "Eltern für atomfreie Zukunft e.V." - association of parents for a nuclear free future

[5] The Bundesnetzagentur or Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway promotes effective competition in the regulated areas and ensures non-discriminatory access to networks (Bundesnetzagentur, 2013).

[6] The Bundeskartellamt is an independent competition authority whose task is to protect competition in Germany (Bundeskartellamt, 2013).

be the next concession holder of a local grid when the concession runs out. We feel the BnetzA is setting up the criteria to make it difficult for us to get involved. Right now in Titisee-Neustadt, EVTN [in which EWS has a stake] has bought the grid, all the contracts are signed and afterwards Energiedienst, the former owner, went to the BnetzA to complain because they felt discriminated during the process.'

Regarding the interaction with government, a distinction should be made between local and national governments. EWS cooperates very well with local politicians, the mayor of Schönau even adresses their annual conference (interview 15). The national government on the ohter hand, is very close to the large four energy companies, according to the correspondent of EWS: 'The Minister of Economic Affairs is a marionette of big industry, he tells whatever nonsense the industry wants him to say.' (interview 15)

Still, Germany is viewed by all our correspondents as 'far ahead' in the energy transition or 'Energiewende' as the project has become known in Germany after the nuclear exit was decided in the aftermath of the Fukushima nuclear disaster (Bosman, 2012). In terms of policy Germany was described as having a stable investment climate (interviews 5&6). On the other hand, it was also denounced as 'over-regulated' (interview 14), and criticised for its feed-in-tariff policies. But most of all, Germany is celebrated by both German and non-Germany correspondents for the collectivist citizen initiatives:

"in Germany in the past 5 years there have been 500 renewable energy cooperatives started (…) almost every day one is started (…) people there really organize themselves already at the level of neighbourhoods… the step to do that in Germany is less big than in other places… and it is supported by an organization (interview 5&6)"

The correspondent from EWS argues that her organisation is an icon of the Energiewende:

'It really is a success story, it influences how people think about the Energiewende, people know about us across the globe. But also financially it's very successful. […] Also we have a lot of visitors from the US, journalists, a TV-station from Australia and Japan, after the Fukushima nuclear disaster. Ursula and Michael Sladek[7] and also myself are invited to talks in different countries, all over the world. (interview 15).

She adds that the Energiewende gives her a reason to be proud of her country: 'What is remarkable is the reaction of people from abroad. People like me from the after war generation sometimes feel ashamed about Germany. New people love Germany because of the Energiewende and we can be proud of our country' (interview 15).

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[7] Founders of EWS Schönau

2.5. Overview of Drivers & Barriers in Case-studies

Table 2. Overview of Drivers and Barriers in Empirical Case-studies of Community Energy Initiatives

Case-study	Drivers	Barriers
Texel Energie	• Strong identity Texel Island • Historical legacy strive for island autonomy	• New/ unrecognised business model (not-for-profit) • Difficulty getting financed
Thermo Bello	• Embedment in eco-community Eva-Lanxmeer • Support local government	• National laws & regulations • Dominance of natural gas in Dutch context • Technological complications
Ecopower	• Co-operative movement - socio-economic concerns • Liberalisation of the energy market • Legal recognition of not-for-profit social enterprise model • Cooperation with local government	• Instable national political climate > • Lack of vision national energy policy • Lack of organised unity between cooperatives in Belgian context
- *Urgha Wind* - *Udny Community Wind*	• Local culture & legacy of collective arrangements • Political push and on the policy agenda • Mediating organisation (*Community Energy Scotland*) • Existing technology at hand (wind energy)	• Risk aversion of banks / financial viability risk • Time-management / project management risks • Grid coverage, connectivity and cost • Incompliant funding mechanisms
Vauban: - *Passivehous »Wohnen & Arbeiten«* - *SUSI-project*	• Support from (some) council members (Green Party) • Perseverance of citizen forum • Professionalism citizen forum (e.g. talking to press) • Legal recognition of citizen 'Baugruppen'	• Scepticism local government bureaucracy • Poor image of co-generation as alternative energy
Elektrizitätswerke *Schönau* (EWS)	• Historical roots in anti-nuclear movement • Rebelling against large four energy companies and making energy supply more democratic • Playing into German anti-nuclear and pro-renewable sentiments • Liberalization of energy market	• Hesitation by local citizens to join and chip in • Difficulty for regulator to assess and assure fair competition

3. A Complex Transition Perspective on Community Energy

When looking at the empirical case-studies and the observed drivers and barriers from a socio-technical multi-level perspective, the verdict is obvious: these community energy initiatives are 'niches', i.e. protected spaces that enable and shelter radical innovation from the pressures of unfavourable socio-technical 'regimes' (Geels 2005, Seyfang & Haxeltine 2012). Each and every 'barrier' that is mentioned in and by the community energy initiatives (see overview in table 1) can be explained in terms of regime factors that the niches are confronted with. These are typical barriers of the socio-technical energy regime, which – regardless of its time, place or other context - include established rules and regulations, dominant energy technologies and infrastructures, institutional and financial standards, and so on and so forth. Obviously, a proper socio-technical multi-level analysis of the community energy initiatives under study would require much more sophisticated and detailed historical and context-specific empirical research. This however, is not the aim of this paper.

As explained in the introduction, this paper aims to explore how we can conceptually frame and analyse the empirical community energy initiatives from a complex transition perspective, what this can contribute to the socio-technical multi-level perspective and what kind of policy suggestions/ transition management suggestions could be formulated on that basis. As also explained in the introduction, there is in fact no such thing as 'the complex transition perspective', rather it is an amalgam of various complex transition perspectives plural. Elaborating on all of these is beyond the aim of this paper. Rather, we focus on discussing three specific elements and implications of complex transition perspectives:

1) Beyond Niches: the Power of Niche-regimes & Undercurrent Counter-movements
2) Beyond Socio-technical System Boundaries: the Socio-cultural Context
3) A Multi-level Governance and Framework

In accordance with the complex transition perspective, we address the linkages between dynamics and management for each of these implications, and we discuss action research implications in terms of questioning how a specific conceptualisation may affect the endeavours of the practitioners under study.

3.1. Beyond Niche: the Power of Niche-regimes & Undercurrent Counter-movements

The MLP is based on distinguishing between different levels of functional aggregation within and outside a socio-technical system under study. Aggregation means that theoretically, there are an infinite amount of many more levels between and beyond the niche, regime and landscape. The choice to focus on specifically these three levels has been informed by its demonstrated added value for describing and analysing empirical processes through time (Geels and Schot 2007; Geels 2010). Nevertheless, it remains relevant to keep questioning the focus on these three levels, and whether there are not additional levels to distinguish that have explanatory added value. Loorbach & Rotmans (2010a) have proposed to add two levels to the multi-level perspective, one being the level of 'niche-regimes', the other being the 'undercurrent level'. We now elaborate on these additional levels and what they mean when applied to the empirical community energy cases.

3.1.1. Niche-Regimes in Community Energy

The '**niche-regime**' refers to "a niche that has grown powerful enough to gain a number of new characteristics, most important of which is the ability to attack (sometimes effectively) an incumbent regime" (Loorbach and Rotmans 2010:136, based on De Haan 2010). Avelino (2011) has defined a niche-regime as a group of actors that exercise 'transformative power', i.e. develop new institutions and structures that enable the spread and up-scaling of innovations.

When we apply the **concept of 'niche-regime' to the community energy initiatives** under study, we can argue that many of the identified drivers and barriers can be explained in terms of the formation of niche-regimes; i.e. collective endeavours to develop new structures and institutions that enable community energy. When the formation of a niche-regime is in a further state of development, this is experienced as a positive driver. For instance, in the UK cases, the existence of the mediating organisation *Community Energy Scotland*, was experienced as an important driver. On the other hand, when a niche-regime is lacking, or when the formation is at an early stage, this is experienced as a barrier. The representatives of *Ecopower* emphasised that one of the main barriers they experienced was the lacking development of organised unity and cooperation between different bottom-up energy initiatives in the Belgian context (something which – they argued – is far more developed in the German and UK context). At the same time, board members of *Ecopower* do profit from, and participate in, niche-regime formation at the European and international level, through e.g. an organisation such as *RESCOOP*.

To a certain extent, niche-regime formation is about mediating between the socio-technical regime on the one hand, and community energy niches on the other hand. Smith (2006,2007) already emphasised the importance of the **'translation'** between niches and regime, a role that is often fulfilled by **intermediaries** (Hielscher et al. 2011). Intermediaries can be defined as "organisations and networks that build links between specific community energy groups, and which exist to share experience, good practice, expertise and advice. In some cases, intermediaries also act as a voice for community energy by providing evidence and advocacy to policy-makers" (Hielscher et al. 2011:7).

While intermediaries can be seen as an important factor in niche-regime formation, we would argue that niche-regime formation is not limited to the actions of intermediary organisations, but can also be enacted by community energy initiatives themselves. Cooperatives *Ecopower* and *Schönau EWS*, for instance, seem to have "grown powerful enough to (…) [effectively] attack (…) [the] incumbent regime" (definition of niche-regime by Loorbach and Rotmans 2010:136, based on De Haan 2010). *Ecopower* has grown enough size and credibility to successfully compete with other energy companies in a council tender competition on wind energy.

3.1.2. Undercurrent Counter-movements in Community Energy

With the 'undercurrent level', Loorbach & Rotmans (2010a) refer to social movements, activist groups and niches that 'exert pressure on niches and/or on the regime'. In a study of car dominance, Zijlstra & Avelino (2012) contrast 'dominant landscape trends' that reinforce car dominance against anti-car movements, and they conceptualise these anti-car movements as 'counter-movements' at the landscape level. In that line of argument, the point is to unpack the exogenous black box of the landscape level, by conceptualising the collective power that large groups of individuals can exercise at the landscape level, distinguishing between 'dominant landscape trends' (as the collective exercise of reinforcive power) and **'undercurrent counter-movements'** (as the collective exercise of transformative power) (Avelino 2011, Frantzeskaki, et al 2012c).

In the case of the community energy initiatives under study, we clearly observe that many of them tap into undercurrent counter-movements, such as e.g. *Schönau EWS* into the anti-nuclear movement, or *Ecopower* and various other cooperatives into the cooperative movement. Through the involvement in these movements, the community energy initiatives team up with international networks and lobby-groups at the European and global level, thereby exerting pressure on international and national governments. We would argue that this kind of pressure is not merely bottom-up niche-pressure, but that we can understand it in terms of an undercurrent counter-movement at the landscape level that also exerts top-down pressure onto the socio-technical energy regime. With 'top-down' here we do not mean authoritatively, we rather mean it in terms of a higher level of aggregation. We would argue that the international cooperative movement has a higher level of aggregation than the e.g. Dutch socio-technical energy regime.

3.1.3. Policy & Action Research Implication: Moving beyond the Niche

From the perspective of strategic niche management (Kemp et al. 1998, Hoogma et al. 2002, Smith and Raven 2012), the focus lies on 'protecting, nurturing and empowering niches'. When applied to the empirical case of community energy, the strategic niche management perspective emphasises niche processes of learning, visions and networking for fostering niche growth and diffusion into the mainstream (Seyfang 2010).

When we shift the focus to also include the perspective of niche-regime and undercurrent counter-movements, this has implications for the kind of learning, visioning and networking that one undertakes from within the niche: learning and visioning about what, and networking with whom? Equally important to – and a precondition for – niche growth and diffusion into the mainstream, is the formation of niche-regimes and the playing into undercurrent counter-movements, thereby exercising collective transformative power at various levels to exert pressure on the socio-technical regime. One of the of the main policy implications for practitioners involved in community energy, is then the need to look and operate beyond the boundaries of the community energy niche.

From a critical action research perspective, we should also be aware of the (unintended) societal effects of characterising empirical phenomena as 'niches'. If the purpose of a heuristic framework is (also) to empower individuals to take action towards a desired goal (e.g. sustainability transition), then we should also be aware of the disempowering effects that the MLP might have in terms of boxing empirical phenomena in terms of 'niches' against powerful 'regimes' and exogenous 'landscape' trends. Even though all transitions literature emphasises that these power relations change over time, and that niches may break-through and replace regimes, the inherently long-term perspective on such processes of change can be particularly disempowering in the context of current situations and on-going processes (Avelino 2011). The concepts of the 'niche-regime' and 'undercurrent counter-movements' helps to unpack the MLP levels and, by doing so, identifying how initiatives and actors may already move beyond their niche-status by teaming up with, and operating at, various other societal levels of aggregation.

3.2. Beyond Socio-technical System Boundaries: the Socio-cultural Context

One of the many things that complex system thinking teaches us, is that system delineation is one of the most essential factors in the outcome of an analysis (Pel 2011). In the socio-technical MLP perspective on transitions, the focus is on delineating socio-technical systems (e.g. mobility, energy, agriculture). In the complex transition perspectives, the system delineation is broadened to societal systems more generally, including socio-ecological systems (Van der Brugge 2009, Frantzeskaki 2011), socio-economic systems

(e.g. Loorbach & Lijnis-Hueffenreuter 2013) and urban systems (Loorbach 2009, Roorda et al. 2012, Frantzeskaki et al. forthcoming).

3.2.1. The Socio-Cultural Context of Community Energy Initiatives.

When dealing with the empirical phenomena of community energy initiatives, it obviously make sense to analyse them as part of socio-technical energy systems. Nevertheless, we also have to remain attentive that by doing so, we are not missing out on other system dynamic elements. For instance, when we look of the list of 'drivers' that drive the community energy initiatives under study (see table 2), we see that all empirical case-studies seem to be driven by strong embedment in a socio-spatial and socio-cultural context that favours a cooperative, citizen-led approach:

- *Texel Energie* is embedded in Texel's island culture that is historically prone to strive for islanders' independence from the mainland
- *Thermo Bello* is embedded in the eco-community of *Eva-Lanxmeer*, for which self-sufficiency lies at the core of its raison d'être
- The organization of *Ecopower* is intertwined with the transnational cooperative movement, which has strong agenda regarding socio-economic sustainability
- The community wind projects of *Udny* and *Urgha* are embedded in a network of community energy initiatives, as well as in Scotland's historical culture of self-reliance and independence
- The German citizen-led housing projects (*Passivehouse »Wohnen & Arbeiten«* and *SUSI-project*) are located in the *eco-district Vauban*, which is renowned for its strong citizens' participation
- The energy company *Schönau EWS* has originally sprouted in an anti-nuclear movement, which in Germany is strongly intertwined with the civil environmental movement

It thus seems that all the projects in our observed case-studies are part of social and cultural communities that have a strong desire to somehow distinguish themselves from the mainstream, dominant culture. Whether it is an island, a town, an eco-district, a network or a social movement, what they have in common is the strive for independence and self-sufficiency, and/or a strong social critique of established governmental and commercial arrangements. It also seems that these social contexts provide a strong driver for the projects to persist and prevail, despite of many institutional barriers. In summary, it seems that self-organised energy initiatives often occur under a particular combination of the following conditions:

- integration in a 'sub-cultural' context;
- a strive for a socio-economic security and autonomy;
- distrust of existing governmental and commercial arrangements.

The first condition – the sub-cultural context – serves to 'cultivate' the second and third conditions; it offers a shared narrative that enables participants to frame their need for security and autonomy and their social critique in a productive way. Moreover, the sub-cultural context also provides the initiative with a sense of 'community' and/or a sense of 'place', which in turn help participants to persist and insist despite of many institutional barriers, unexpected events and disappointing let-downs.

3.2.2. Delineating the Systemic Context in Transition Analyses

The subsequent question is to what extent the socio-technical system delineation is sufficient for capturing and analysing the dynamics of these socio-cultural contexts.

Understanding this socio-cultural context asks, in the first place, for more sensitivity to geographic and spatial properties. Various authors have already called for a 'spatial turn' in transition studies, calling attention to the geography of innovation (Coenen et al. 2012, Späth & Rohracher 2012, Raven et al. 2012) and urban innovation processes (Loorbach 2009, Hodson & Marvin 2010, Frantzeskaki et al. 2012, Wittmayer et al. 2012). From this perspective, community energy initiatives can be seen as part of a specific geographic system that responds via self-organisation to the pressures unique to the spatial environment. As such, spatially specific cases offer grounds to investigate what constitutes reflexivity in taping into innovation and foster transitions; avoiding generalisations from spatially demarcated cases.

Analysing community energy initiatives in the context of a particular geographical system may provide a better understanding of the socio-cultural context of these cases, then a mere socio-technical perspective. Moreover, in order to more fully capture the socio-cultural dynamics, it might be necessary to not only take account of the geographical systems, but also of the more physically intangible socio-cultural system consisting of e.g. discourses, communities, identities and ideologies. Obviously, these factors are all already part of a proper socio-technical system analysis and/or a geographical analysis, but then they are seen as dimensions, rather than as societal systems in themselves. The point that we are making here is that if we were to take e.g. the 'transnational cooperative movement' or 'the sustainability discourse' as 'the societal system' to analyse the contextual dynamics of a community energy, we would get a significantly different analysis than if we are to take the socio-technical energy system or a particular geographical system as a starting point.

The ultimate challenge for the complex transition perspective, is to analyse how empirical phenomena under study are part of and influenced by a multitude of societal systems dynamics, including socio-technical, socio-ecological, and discursive systems, all of which have a variety of different scale dimensions, including geographical scales, time scales, as well as scales of aggregation. These scales may coincide, but not necessarily (e.g. a niche is not necessarily local, and a landscape trend is not necessarily global) – so the particular overlap and interaction between different scales is a context-specific empirical question. The community energy initiative *Ecopower* operates at a national geographic level, is part a socio-technical energy system (local/national/European/international), as well as part of the cooperative movement, a highly transnational social movement network and discourse. The question of how and to what extent *Ecopower* as a 'niche' can 'succeed' in growing and diffusing, does not only depend on how it interacts with the socio-technical regime, but also how it sits within different geographical levels (including their respective cultural identities), and how it resonates with the transnational cooperative movement and its political discourses. Moreover – to complicate it even more – the question is how these different 'contexts' interact with one another over time, and how this inter-systemic dynamics affects the timing and resonance of *Ecopower's* interventions.

3.2.3. Policy & Action Research Implications: Beyond Socio-technical System Boundaries

Obviously, the analytical challenge outlined above is highly complex and prone to reach exceeding levels of abstraction. The immediate question that follows from an action research perspective is how and to what extent such endeavour has heuristic value to understand and deal with 'real world problems'.

When we acknowledge that system boundaries are very determining for the outcome of an analysis (and thus for the chosen intervention), while at the same time being inherently complex, subjective and overlapping, one policy implication for the topic of community energy could be that policy interventions in that domain should start by questioning and

discussing which system boundaries are relevant, rather than starting off with a given system boundary (e.g. 'energy' as the given 'socio-technical system' or 'policy field'). If a scientific analysis has the purpose of informing such societal intervention – which it does in the philosophy of action research – than an analytical implication could be that the first step is to reconsider which system delineations are relevant for a particular community under study. In the context of transition action research – where the purpose is to understand and foster (opportunities for) fundamental change – some have argued that the critical challenging of dominant system boundaries and replacing these by alternative system understanding is a necessary and important first cognitive step in that process of fundamental change (Avelino 2011).

Even if a scientific analysis does require a pre-given system delineation (which if often does due to pragmatic considerations such as time constraint and limited data), than it is worth asking whether there are some 'generic patterns' for determining whether some delineations are more productive and useful in a given context than others. If, for instance, in the case of community energy initiatives, an analysts would *have* to choose between either a socio-technical system delineation *or* a geographic delineation, we would argue that the latter might be more useful to understand the observed drivers behind the community energy initiatives (as listed in table 2). After all, the drivers behind these *community* energy initiatives are related to intrinsic motivation of the people involved, which in turn relates to their personal and cultural identity. Overall, people identify much more with a geographic system (e.g. their city, village or country) or a socio-cultural system (e.g. community of practice or social movement), than with a functional, socio-technical system. If one of the purposes of an transition analysis is also to tap into the individual drivers of people to contribute to sustainability transitions, than a logical implication might be that the analytical stories we tell are delineated in such a way that (more) people under study can identify with it (not only policy-makers, but also citizens that are making use of and living within the systems under study). This is also one of the reasons why recent transition management practices and studies have increasingly focus on the urban system focus (Wittmayer et al. 2012, Roorda et al. 2012, Roorda 2012 and Van Steenbergen et al. 2012). In the case of community energy initiatives, these are often not part of urban systems, but rather take place in a rural or suburban context. If we to analyse these from an action research and transition management perspective, the challenge then is to analyse these community energy initiatives in the context of particular regional systems (e.g. Henneman et al. 2012).

3.3. A Multi-level Governance Framework

While the transition management perspective is primarily associated with a prescriptive management framework, it also can be and has been used as a descriptive and analytical framework to analyse on-going policy processes (Loorbach 2007, Avelino 2011, Frantzeskaki et al. forthcoming). One of the descriptive and analytical tools in transition management is the multi-level governance framework (Loorbach, 2010) that distinguishes between four governance levels with distinct functions and activities:

1. the strategic level, including processes and activities of setting long-term goals, policy development, planning, vision, values, identity, culture of the city;
2. the tactical level including designing steering activities, programs, funding, establishment of networks and/or partnerships;
3. the operational level including implementing and managing policy action plans, infrastructure plans and assets and
4. the reflexive level with monitoring, assessing and evaluating existing policies and assets and their interaction with citizens.

This framework can be used for diagnosing the type of activities (strategic, tactical, operational and reflexive) that are undertaken by practitioners under study, within and across the multiple governance levels. Moreover, the framework can also be used to identify possible interventions to deal with challenges.

In the case of the community energy initiatives under study, one can analyse the different drivers and barriers (as outlined in table 2) in terms of the different activities that the practitioners involved do or do not undertake at different governance levels. For each driver and for each barrier one can also systematically map out, which activity at which governance level can be undertaken to make better use of the drivers and/or to deal with the barriers. In the table below we have worked out an example of such analysis of some of the barriers as observed in the community energy initiatives under study, translating these in terms of possible interventions at each level of governance.

Table 3. Multi-level Governance Interventions to Deal with Barriers in Community Energy

Multi-level Interventions → Barriers ↓	Strategic	Tactical	Operational	Reflexive
"Unrecognised business model (not-for-profit) > Difficulty getting financed"	Envisioning a new, alternative economic system (e.g. 'green economy', 'social/ cooperative economics')	Develop/ participate in networks and intermediary organisations working with alternative business models	Starting up e.g. crowd-funding campaign	Critical evaluation of current business models / financing systems – monitoring best practices of alternative
"Lack of vision national energy policy "	Create own vision as a flagship to attract interest and have own message communicated broadly	Develop/ participate in networks that share interest in alternative energy, invest in and lobby for it	Use existing community energy projects as icon projects to visualise parts of possible future	Critical evaluation of existing energy policy / collecting best practices of alternative policies
"Lack of organised unity between cooperatives in Belgian context"	Envisioning alternative sustainable future for Belgium + back-casting potential role of organised unity of cooperatives	Creating partnerships, networks and learning alliances between cooperatives	Organising a concrete pilot project in which multiple cooperatives cooperate to reach a tangible project result	Monitoring existing cooperatives and analysing potential added value of more organised cooperation
"Dominance of natural gas in Dutch context"	Create a vision of Dutch energy system where natural gas is absent / not dominant	Develop/ participate in networks lobby against natural gas interests and/or lobby for alternative energy	Organising event/ exhibition to show-case disadvantages of natural gas and/or advantages of energy alternatives	Provide evidence that alternative systems provide services in a reliable way to create windows of change in existing regime

The table above provides an example of how we can identify different potential interventions to deal with experienced barriers. Beneath the details of each suggested intervention, there is a more overarching policy suggestion, that being that dealing with

the barriers of community energy initiatives (and/or playing into the drivers), requires a combination of all governance levels.

4. Conclusions

In this paper we aimed to expand the transitions perspective on community energy by exploring a 'complex transition perspective' to analyse community energy initiatives in four West-European countries (The Netherlands, Germany, Belgium and UK). By doing so, we contributed to existing transitions studies of community energy, which so far are predominantly focused on analysing empirical examples in the UK from a socio-technical Multi-Level Perspective (MLP). First, we started with the empirical descriptions of eight case-studies of community energy initiatives, describing drivers and barriers in the community energy initiatives, as experienced by the practitioners involved. Subsequently, in section 3, we considered these empirical observations from a complex transition perspective, specifying what the analytical implications are of taking such perspective, how this differs from the socio-technical multi-level perspective (MLP), and what kind of implications it has for action research and policy. We identified and discussed the following three implications of a complex transition perspective:

1) **Beyond Niches: the Power of Niche-regimes & Undercurrent Counter-movements**. We expanded the MLP by adding two levels: the level of 'niche-regimes' and the level of 'undercurrent counter-movements'. In the community energy initiatives under study we observed how they operate at these levels to exert pressure on regimes. The concepts of the 'niche-regime' and 'undercurrent counter-movements' help to unpack the MLP levels and, by doing so, identifying how community energy initiatives move beyond their 'niche-status' by teaming up with, and operating at, various other societal levels of aggregation.

2) **Beyond Socio-technical System Boundaries: the Socio-cultural Context**. In the energy community initiatives under study, we observed that in each of the eight cases is significantly driven by a strong embedment in a socio-cultural context that favours a cooperative, citizen-led approach (e.g. eco-district, network, social movement). We questioned to what extent a socio-technical system delineation is fruitful in capturing this socio-cultural context, which might be better served by a geographic or socio-cultural system delineation. From a complex transition perspective, the challenge is to analyse how empirical phenomena under study are part of and influenced by a multitude of societal systems dynamics at different scales. However, if an analyst needs to select one system delineation over another, we argued that geographic or socio-cultural delineations might be more identifiable for the individuals actually inhabiting the systems under study, thus making these geographic and socio-cultural delineations more suitable for action research on the transition dynamics of community energy.

3) **A Multi-level Governance Framework**. The literature on transition management offers a multi-level governance framework that can be used as a descriptive and analytical to understand governance dynamics, and as a prescriptive framework to identify potential interventions. In the case of community energy initiatives, we can use this framework to identify potential interventions to deal with the experienced barriers, systematically considering the strategic, tactical and operational level, as well as the reflexive level of governance. From a complex

transition perspective, the starting point is that dealing with the barriers of community energy initiatives, requires a combination of interventions at all these governance levels.

The implications of a complex transition perspective, as discussed in this paper, point out various challenges for future research. The two main challenges for future research that run through all of the three abovementioned themes can be distilled as follows. First, to analyse transition processes as a complex interaction between various societal systems dynamics, including socio-technical, socio-ecological, and socio-political systems, all of which have a variety of different scale dimensions, including geographical scales, time scales, as well as different scales of aggregation. Second, to translate the gained insights on complex transition dynamics into opportunities for actions, drawing policy lessons and tools to empower practitioners to smartly play into the complex system dynamics so as to contribute to transitions towards sustainability. With this paper, we hope to have contributed to the framing of some of the remaining theoretical and empirical challenges for future research on sustainability transitions from a complex transition perspective.

Acknowledgements

Appendix

Nr.	Function	Organisational Context	Date	Case-study
1	Coordinator renewable energy	Aberdeenshire Council	03.10.11	*General: Scotland Energy*
2	Professor	James Hutton Institute	05.10.11	*General: Scotland Energy*
3	Board member	Thermo Bello	23.02.12	*Thermo Bello*
	Citizen	Eva-Lanxmeer		*Eco-district Eva-Lanxmeer*
4	Group Leader	Community Energy Scotland	05.03.12	*General: Scotland Energy*
5	Board member 1	Ecopower	13.03.12	*Ecopower*
6	Board member 2	Ecopower	13.03.12	*Ecopower*
		Co-operatives Europe		*Co-operative movement*
7	Water Expert 1	Watercycle Research Institute	13.03.12	*General Infrastructure*
8	Water Expert 2	Watercycle Research Institute	13.03.12	*General Infrastructure*
9	Expert	Several projects in solar energy and eco-construction	27.03.12	*General Infrastructure*
10	Expert	Technical University Delft	29.03.12	*General Infrastructure*
11	Board member	Texel Energie	14.05.12	*Texel Energie / Island Texel*
12	Expert & citizen	Passivehouse »Wohnen & Arbeiten« Vauban Freiburg	14.05.12	*Eco-district Vauban Freiburg*
13	Energy Officer	North Harris Trust	14.05.12	*Urgha Wind / North Harris Trust*
14	Member & citizen	Housing Community SUSI-project Vauban Freiburg	24.05.12	*Eco-district Vauban Freiburg*
15	Public Affairs Officer	EWS Schönau	10.07.13	*EWS Schönau*

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Transition Pathways Towards a Sustainable, Low Carbon Europe Developed by Pupils and Professionals Across 6 EU Countries

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Abstract

There is an *a priori* argument that those who are affected by a decision should have a say in that decision. In terms of intergenerational equity, as well as the need to implement whatever Transition Management (pathways, trajectories) implementation is to take place, young people should therefore be included in the decision-making process, be this for ethical or operational reasons. Given the socio-cultural context, the changing nature of technology etc., Generation Z is likely to have very different notions of their specific future, and the way sustainability and low-carbon lifestyles are evolving within this. This implies the distinct possibility that (older) experts may devise and shape transition pathways towards greater sustainability and less carbon-intensive lifestyles, but may do so without the inclusion of, and in a direction that those who are destined to live (in) these futures may find difficult to accept, let alone actively pursue. In short, not involving young people in the Transition Pathways and Management agenda poses a genuine governance deficit, as well as an implementation challenge.

To understand how young people conceptualise their future in low-carbon sustainability terms, and how they conceive suitable visions of their futures, CRISP (an EU project to CReating Innovative Sustainability Pathways), 24 visioning and backcasting workshops were held in Greece, Hungary, Lithuania, Norway, The Netherlands and the UK. The resulting workshop-level visions, which produced over 1500 ideas and suggestions across the workshops, were then condensed into 3 pan-European Visions yielded three archetypical visions, namely Local Community, I-Tech, and One Ethical World.

Following this, a new methodology was developed and applied in 17 workshops across the aforementioned countries, engaging young people and experts in developing suitable pathways towards the realisation of the above visions. Both phases were done in conjunction with 3 specific sectors, namely household energy, individual mobility and food. After an outline of the visions, this paper outlines the pupils' perception, followed by an exploration of the resulting pathways for the three visions across the three sectors.

Introduction

In a fast pacing world, where the consumption of resources has been amplified, the use of raw materials has been intensified and population continuous to grow, the ability of future generations to have access to the resources and be able to enjoy a comfortable life is at stake. This has been recognised as a major concern and many initiatives are now driven towards sustainable development. The concept of sustainability and sustainable

development has been around for decades, but only relatively recently did it attract mainstream attention and became one of the top priorities of the green agenda. For sustainable development to be achieved, a holistic, integrated and suitable approach is required to better portrait the problem and find a solution that is viable and long-term. This is because, sustainable development is subject to the interconnections between ecological, economic and social-cultural characteristics, and for it to be realised, cooperation of all relevant stakeholders, whether this is government, industries, institutions, communities and individuals, is highly required.

There remains substantial obstacles for a more fundamental change (be this in pace or direction) towards more sustainable living at the individual level, with many common problems that can be divided into lethargy, difficulties in translating ethical behaviours into sustainable activities, the perception of myopic change in the face of the need for global transition, game theory dilemmas, scepticism towards the need for such change, availability of alternatives (and technologies) and a sense of detachment between policy, practice and long-term visions. Therefore, interactions between relevant stakeholders at different levels and the reinforcement of initiatives towards sustainable development are important as it acts as the forerunner in achieving the transition towards sustainability. However, such interactions and subsequent transitions are complex because of the dynamics and interconnections between cultural, social, organisational, economic and technological changes and of the uncertainty of future predictions that affect stakeholders and the society in general (Quist and Vergragt, 2006). Of course, the large the required change, and the longer the time-frame, the greater the uncertainties, and thus the greater the need for greater social inclusion in the deliberations. To deal with this complexity, action to foresee, or at least make sense of, long-term sustainability which then allows to develop visions of suitable future has been proposed (Berkhout, 2005; Rotmans, 2005; Wiek, Binder and Scholz, 2006). Following these visions of the future, transition pathways that describe specific actions towards such future vision have to be developed.

These transition pathways however, are not easy as they have to take into account pragmatically the dynamics and interactions between different levels, actors and niches and the complexity that is associated with them. Only then, transition pathways can provide an efficient and reliable approach towards a desirable and sustainable future. The development of transition pathways typically involves the participation of experts, and relevant stakeholders who have the knowledge and expertise to grasp and deal with the complexity of such processes. However, the involvement of young people in the development of such visions and their transition pathways is of great importance as well - it is their future that will be affected by the pathways, and they will experience the necessary changes for the achievement of a sustainable future. The need for young people to participate in the development of policies and strategies and subsequent implementation has also been supported in many studies (cf. Wyn and Dwyer, 2012).

This engagement empowers young people in being responsible and accountable of their actions, and ensures the inclusion of a wide variety of concerns, insights and reflections, that delivers consistent and well-thought decisions (Carlsson-Kanyama et al 2008). Involving young people also offers a greater chance that they are more agreeable to the changes; they may in fact become more pro-active in contributing to these, or even committed and insightful in proposing new, more drastic ones. Also, the generational gap that underlines the difference in how young people perceive their future as opposed to the elders creates a degree of an uncertainty as to whether the transition pathway will be able to lead society to its future destination. As such, the inclusion of young people to the process of transition pathways development is essential for their successful implementation in the future. However, the unfortunate reality is that those involved with

shaping these futures (older experts) are typically unlikely to live in these futures, and, worse still, *vice versa*.

This paper demonstrates the importance and practice of young people participation in the development of transition pathways by involving young people alongside with experts in the development of pathways towards a sustainable, low carbon Europe. The aim of the paper is to present the pathways developed and highlight the main actions that have to be undertaken for the future visions, that each pathway leads to, to be realised.

Background

For the development of transition pathways, a number of different approaches can be followed. Although, these approaches share some similarities, differences also emerge as a result of the stakeholders involved, the dimensions considered or the steps taken. The most prominent methodologies for the identification of transition pathways towards transition visions, are the backcasting methodologies and the multi-level framework (Smith and Stirling, 2010; Quist 2007).

Backcasting, a methodology introduced in the 1970s, was originally proposed by Amory Lovins as a technique for long-range energy planning called 'backwards-looking analysis'. A few years later Robinson proposed the term 'backcasting' that has remained until today (Robinsons, 1982; Quist and Vergragt, 2006; Mander et al. 2008; Kok et al. 2011; Carlsson-Kanyama et al. 2008). Fundamentally, backcasting is a process during which a future end-point is typically defined by a diverse group of stakeholders, which then considers present objectives and ways through which the defined future end-point, or vision can be attained (Figure 1).
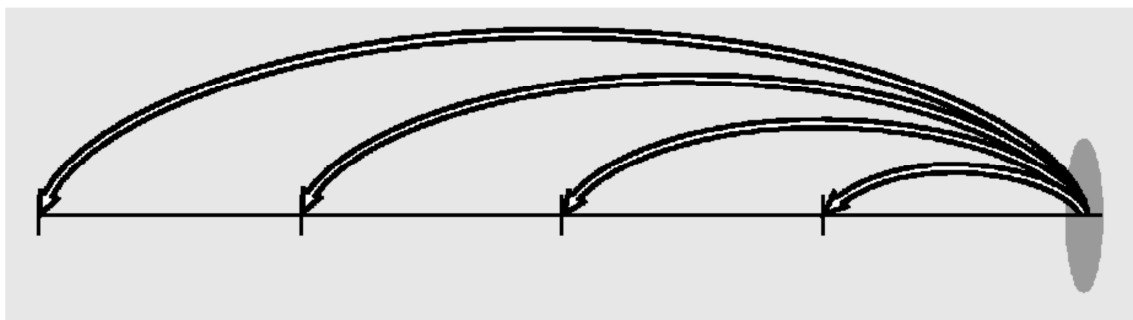

Figure 7: Backcasting representation (Rotmans, 2001)

In the literature there is a long list of studies in which interactive, participatory backcasting is proposed and/or used as a suitable and useful method to explore transition pathways (van de Kerkoff and Wieczorek, 2005; Quist and Vergragt, 2006; van den Kerkoff, 2004; Rotmans, 2001; Jansen 2002; Carlsson-Kanyama et al. 2008). The success of this method relies on its potential to include a broad selection of stakeholders, a variety of visions and a number of participatory and analytical exercises, making it a promising and innovative tool (van de Kerkoff and Wieczorek, 2005; Quist and Vergragt, 2006). However, there is ambiguity as to how backcasting can be translated in different studies as it can constitute a conceptual or holistic level, a level of social or multi-actor processes, a level of an overall approach or a level of specific steps within an overall approach (Quist and Vergragt, 2006). To clarify this, Quist and Vergragt (2006) proposed a five-step methodological framework for participatory backcasting:

- Strategic problem orientation
- Construction of sustainable future visions or scenarios

- Backcasting
- Elaboration, analysis and defining follow-up and action agenda
- Embedding of results and generating follow-up and implementation.

Following a similar methodological framework, van de Kerkoff and Wieczorek (2005) used the experience gained in the Dutch C̲limate O̲pti̲O̲ns for the L̲ong-term (COOL) project and suggested that interactive backcasting exercises are suitable to facilitate exploration of a variety of visions and pathways towards these visions (van de Kerkoff and Wieczorek, 2005). They highlighted that the selection of these visions must be the starting point of the backcasting exercises. Having selected the visions, participants can then work backwards to the present, where the initiation of discussions will be stimulated and directed in formulating the changes that need to be undertaken, the obstacles that must overcome and the opportunities that must be seized for the visions to be realised (van de Kerkoff and Wieczorek, 2005). These authors also suggested that backcasting exercises can enable participants to distance themselves from their daily interests and concerns, while at the same time making them feel involved in the whole process and becoming aware that their suggestions are important and can have an impact in decision-making (van de Kerkoff and Wieczorek, 2005).

In contrast, Carlsson-Kanyama et al. (2008) reported a participatory backcasting methodology used in their study for the development of pathways towards a sustainable everyday city life in the EU although feasible, was lacking comprehension and completion. They asserted that this was primarily due to the lack of involvement of participants with varied backgrounds, expertise and values, which as a result had an effect in the process. They suggested that for the backcasting process to be successful, an innovative approach must be implemented that would enable participants to distant themselves from their concerns and thoughts and become more imaginative, which resonates with van de Kerkhoff & Wieczoreck's ideas. This would allow the development of a thorough and well-structured plan for realising the visions and understanding the changes that have to be made.

To tackle the challenges posed by the use of backcasting methodology, Kok et al. (2011) in their study on the development of pathways for dealing with the Water Framework Directive (WFD) in Europe, proposed the combination of participative backcasting with exploratory scenario development. This represents a recently introduced method to deal with high uncertainty and complex problems associated with long-term visions. Kok et al. (2011) used exploratory scenario development based on the Story-And-Simulation, whereas the backcasting framework used, was the one developed by Quist and Vergragt (2006). They supported that the combination of the two methodologies provides a useful and comprehensive perspective, and allows stakeholders to develop a set of consistent scenarios by gaining a better understanding of their future.

The combination of backcasting with other methodologies has also been acknowledged and/or applied by Borjeson et al. (2006), Hojer and Mattsson (2000), Eames and MacDowall (2011) and Mander et al. (2008) among others. More specifically, Borjeson et al. (2006) reviewed and discussed the outputs of different techniques being integrated for the development of scenarios/pathways, and provided guidance as to which methodologies are more appropriate depending on purpose. Further, Hojer and Mattsson (2000) in their study supported that backcasting in combination with forecasting can provide a greater insight output because, as they argue, forecasting not only informs on when backcasting is needed, but also determines the backcasts. This recommendation is shared by Mander et al. (2008) who in their study to support the UK to achieve a 60% reduction in carbon emissions, suggested that combining backcasting and forecasting is

beneficial for the development of transition pathways towards carbon reduction emissions. Another example of the use of integrated techniques is demonstrated by Eames and MacDowall (2010), who in their exploration of transition pathways towards a hydrogen economy, used a combination of participatory backcasting with multi-criteria decision analysis tool called multi-criteria mapping (MCM). These authors supported that the backcasting approach allowed them to engage and explore the varying interests of stakeholders involved in the process, whereas the MCM appraisal was beneficial in getting an integrated perspective on the sustainability of different hydrogen futures. The inclusion of the multi-level perspective across regime, niches and landscape, in their analysis highlighted the importance of social, economic, political and technological perspectives in shaping transition pathways. In conclusion, there is methodological evidence and experience that social deliberation can contribute to the development of long-term plans towards large-scale change. This enhances the possibilities that includision of young people (and thus non-experts) in such deliberation is beneficial, apart from the prima facie argument that such inclusion is a necessity for reasons of governance, ethics and operational considerations.

The multi-level perspective (MLP) is a recently developed approach that focuses on the analysis of the dynamics of transitions. The term multi-level refers to the interactions between technological niches, socio-technical regimes and landscapes, which constitute the micro-, meso- and macro- levels respectively, of the MLP (Figure 2) (Geels, 2002; Geels, 2006 Foxon et al. 2010; Lachman, 2013). Each one of these levels has a broader meaning. More particularly, the technological niches provide space where learning occurs, and where social networks congregate to support the generation and development of radical innovations. The social-technical regimes are practices, rules and shared assumptions within which the dominant actors interact with each other and with their environment (Landscape), whereas landscape is the wider space, where social, political and cultural values, economy, demography and the natural environment, and institutions evolve (Geels, 2002; Foxon et al. 2010; Lachman, 2013; Geels, 2005; Rotmans et al., 2001). Landscape is a structural factor that can lead to fundamental changes in socio-technical regimes by influencing the regimes and providing opportunities for niches to be established (Markard et al., 2012).
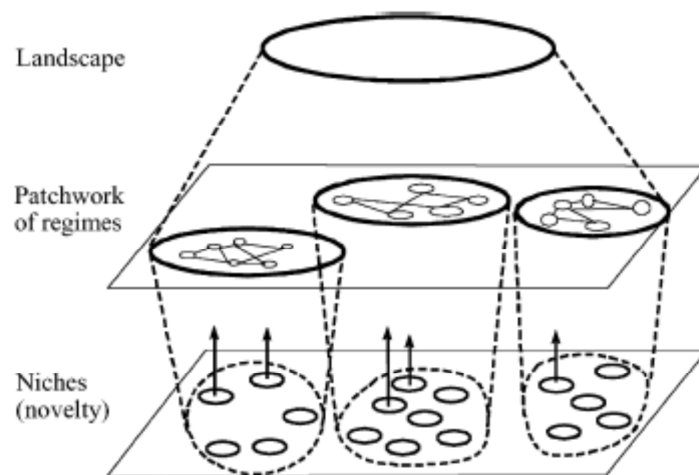

Figure 8: Representation of the multi-level perspective (Geels, 2002)

The MLP has been used for the development of transition pathways by many authors (Geels, 2002, 2005a,b, 2006a,b; van den Ende and Kemp, 1999; Foxon et al. 2010). These studies built, among others, on the work of Kemp, Rip, and Schot (Kemp et al., 2001; Rip

and Kemp, 1998). Geels and Schot (2007b) have elaborated how time and interactions between niche-regime-landscape can lead to different transitions which can follow different types of transition pathways. Further, Foxon et al. (2010) have used the MLP and showed that its integration with technological innovation systems can provide a more thorough analytical basis for the development of transition pathways to a low carbon, electricity system in the UK.

The pathways towards a sustainable, low carbon Europe

Creating Innovative Sustainability Pathways (CRISP) is an EU project involving six countries, namely the UK, the Netherlands, Norway, Lithuania, Hungary and Greece, that aims to develop visions of sustainable, low-carbon lifestyles for Europe in 2030, and viable pathways to achieve these. The development of such visions and their corresponding pathways requires profound and fundamental changes across many aspects of society and lifestyles, whilst in many instances it necessitates radical changes with respect to different practices (household, individual and corporate), networks and infrastructures, structures of governance and decision-making processes, as well as a renewed set of ethical values and cultures.

The theories of Backcasting and Multi-level perspective, described in the background above, have as a result been mingled and used in achieving the development of pathways towards a sustainable and equitable future. Following the principles of backcasting, the first step of CRISP was to define a problem, scope or vision, followed by the objectives, goals and changes that have to be made in order to enable these visions to be realised. This was done with stakeholder fora in each of the participating countries, involving school pupils in their last year of school before being eligible for University. In total 24 workshops were held, with over 50 workshop-specific visions being developed, based on an aggregation of about 1500 individual ideas. These visions were then considered and compared, with a CRISP workshop conducted to synthesise these workshops into a smaller set of overarching end-visions. Three visions were identified and developed, called Local Community, iTech and One Ethical World presenting broad characteristics as follows:

- *Local Community*: Strong regional identity, local production for local consumption, emphasis on social relationships, vegetarianism, social cohesion, individual responsibility, collaborative consumption.

- *One Ethical World:* globalised supply chain, global values are locally interpreted, global healthcare, global governance. Fair trade displaces free trade.

- *I-Tech:* technology and innovation drives everything. Highly competitive world. Risk is replaced by intelligent machinery. Functional food and non-animal derived meat dominates.

A more detailed description of the characteristics of each vision can be found elsewhere. By using the concept of transitions, these visions were then examined under the prism of current and future global and local change, using 2013 as the base year and 2030 as the endpoint, and with focus on mobility, food and household energy (Figure 4). To continue with the social inclusion emphasis, a second round of workshops and seminars were organised – 17 in total - to develop viable pathways towards achieving these visions (Figure 3):

	One Ethical World	Local Community	iTech	Sum
Food	SIFO (Norway) - Expert CEU (Hungary) – Expert CEU (Hungary) - Public	Surrey, (UK) – Expert RUG (Netherlands) - Expert	KTU (Lithuania) - Expert	6
Energy	RUG (Netherlands) - Expert	Surrey, (UK) - Public TNO (Netherlands) - Expert TNO (Netherlands) – Public	SIFO (Norway) – Expert TEI (Greece) - Expert	6
Mobility	Surrey (UK) - Public	CEU (Hungary) – Expert TEI (Greece) - Public	Surrey, (UK) - Public (x2/ parallel sessions)	5
Sum	5	7	5	17

Whilst the majority of the workshops were with pupils of the same age as the first round of workshop, a significant number of workshops were also held with experts in the field of the three sectors. This was done to aid an analysis of the difference between the pathways designed by young people or by experts, as well as their respective views on the process and its outcomes.

After this, the many workshop outputs were grouped into a number of dimensions that aimed to describe and differentiate the changes that are necessary to be taken from a number of different perspectives. These dimensions, namely Structure, Practices and Culture, co-depend in their direction and success and fit within each other following a synergistic behaviour towards each future vision (Figure 3).
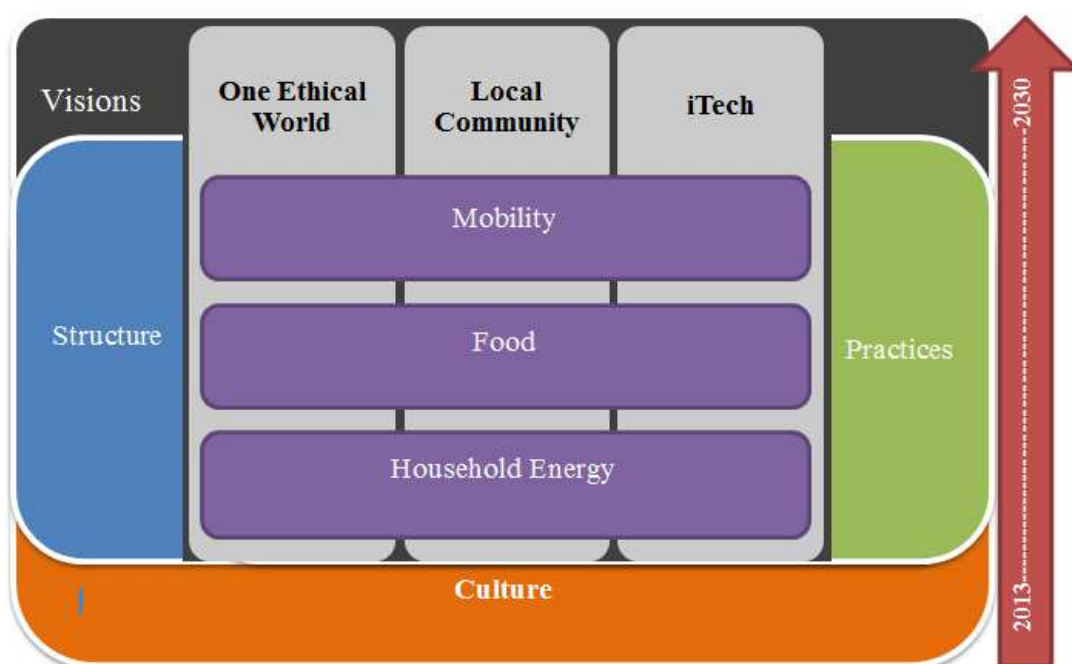
Figure 4: The structure for the visions' pathways

In comparison to the other dimensions, culture is a much more abstract dimension that affects structure and practices and is affected by them in the long-term. The magnitude and direction of the effect of culture depends on history, spatial characteristics, socio-political situation and economic status. Therefore, no specific actions or concepts were distinguished in this dimension as neither a chronological order can define it. This is not to say that culture is irrelevant or meaningless, to the contrary, but it is a dimension that is difficult to "manage" in a deterministic sense, and thus does not sit easily in a task-oriented pathway that features clear delineation and attribution of events with their corresponding effects. Structure and Practices, however, can evolve through time and can be shaped by direct (and directed) interventions. The former dimension has been split into two, with Governance as well as Infrastructure and Networks being the backbone of the realisation and organising of change. Practices represent action and behavioural change towards the achievement of the structured changes, and is influenced by both structure and culture.

Presentation of the pathways

The presentation of the vision pathways based on the three dimensions allows the comparison and assessment of the individual activities of the different pathways. It fosters the analysis of convergent and divergent activities between the pathways and includes the ideas, suggestions and perceptions of the future of professionals and pupils, emerged from the workshop results.

Four phases are distinguished towards the development of the pathways with each phase denoted at a specific time interval. These phases, called Pre-development, Take-off, Acceleration and Stabilisation in ascending order were denoted with a three-year, ten and four-year time interval, respectively, where Take-off and Acceleration was combined for some of the dimensions, notable "practice". As mentioned, year 2013 was the base year and 2030 the projection year. Based on the common elements between the pathways

from a given time interval, different clusters were formed that contained the homogeneous elements that "fit" the development and stream of change (Table 1).

Table 5 Phases of the pathways and clusters within each phase based on their common elements

Pre-Development		
Governance	**Infrastructure / Networks**	**Practices**
• Political Support • Principles of behaviour • Support Industry/Innovation • Education • Strengthen Local/Global Community	• Food Infrastructure – Initiation • Transport Infrastructure - Initiation • Energy Infrastructure – Initiation	• Food Practices - Initiation • Transport Practices - Initiation • Energy Practices - Initiation
Take-Off		
Governance	**Infrastructure / Networks**	**Practices**
• Consolidate/Relocate Governance • Products and Production Reform • Supporting Innovation	• Food Infrastructure - Roll Out • Transport Infrastructure - Roll Out • Energy Infrastructure - Roll Out	• Food Practices - Roll Out • Transport Practices - Roll Out • Energy Practices - Roll Out
Acceleration		
Governance	**Infrastructure / Networks**	**Practices**
Consolidate/Relocate Budgets	(cont. of phase 2)	(cont. of phase 2)
Stabilisation		
Governance	**Infrastructure / Networks**	**Practices**
Assessment of Distribution Effects	Food, Transport and Energy Infrastructure Integration	Food, Transport and Energy Practices Integration

For the Infrastructure and Practices dimensions, Phase 2 and 3 are seen as one phase that expands into a 10-year time. This is because many of the activities that are necessary in both dimensions cannot be fully attained in a 5-year period – as for instance, the development of a suitable electricity grid that inevitably will take longer than 5 years to implement. The narrative of the developed pathways towards the three visions is presented below.

The narratives of the pathways

One Ethical World

The pathway towards *One Ethical World* requires in the first phase a number of drastic measures to be taken: On the Governance front, it requires the establishment of the principles of behaviour for enabling the development of global etiquette for business conduct, allowing fair and equitable trade principles for underpinning policies and reflecting externalities in food prices. It also needs the regulation of industry to encourage incorporation of global, social and environmental responsibility, as part of a wider effort

to support industry and innovation. Education is a further important aspect to Governance, for nurturing global understanding and cultivating fairness and cooperation at a young age, but also to ensure higher education translates competencies and insights from research towards their application by future graduates.

The strengthening of the local/global community to develop and subsequently enforce common interests across national boundaries is another requirement. On the Infrastructure side, the pathway requires the development and support of food, transport and energy infrastructure. The initiation of this development necessitates the creation of a food system based on fair trade and food security (food), the development of low carbon modes of transport (transport) and of an integrated renewable energy system (energy). These are reliant on the development of new models of business practice and the mobilisation of young people and consumers, all reinforced by people collaboration and networks. On the Practices level, which is governed by food, transport and energy practices, the pathway requires an increase in vegetarianism (food) and in teleworking and teleconferencing (transport), which can both be stimulated by awareness raising campaigns organised by groups of people and networks.

In the second phase and on the Governance level the pathway requires consolidation and relocation of governance through the enactment of strict food quality controls, accountability of governance and land reform. It also requires production companies to comply with the ethical and sustainable measures of production under reformation plans. On the Infrastructure side, the roll out of food, transport and energy infrastructure requires major improvements to be made with food production and storage based on sustainable standards being only one of them. This opens the way for the practice requirements in terms of food, transport and energy to be revisited and reviewed, in order to enable the introduction of meat free days in the public sector catering, the promotion of zero-waste generation in households (food) and the closure of gas and coal power stations by the supremacy of the use of alternative and renewable energy sources. For the realisation of this stage, however, trust must be put upon the international institutions, people and networks.

In the third phase and on the Governance side, the pathway requires the consolidation and relocation of budgets that will bring fiscal reform and budgeting at global level. On the Infrastructure and Practices level, the roll-out initiated in phase two continues as the time-consuming nature of the activities involved in these dimensions means that more time is allocated into these actions.

In the fourth phase, the pathway requires an assessment of the distribution effects by focusing on the fair distribution of resources, enforcing legislations for the wiping out of any remaining unethical practices in the production and provision of goods, and increasing regional specialisation for mutual benefit. These requirements are set on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy support, development and performance, respectively. More specifically, in the infrastructure level, an internationally integrated low carbon transport system, that is clean, efficient, reliable, and publicly and privately available (transport), together with an internationally integrated smart grid (energy) are ultimate goals.

Local Community

The pathway towards the *Local Community* vision requires on the Governance side, the implementation of the principles of behaviour, such as policies to incorporate externalities into pricing and support for "local first" guidance on purchasing, and the support to local

industry and innovation to be endorsed, through the promotion of local R&D and the support of local specificity in product design. Alongside this, education is also required in order to foster skills for local sustainable living. An overall strengthening of the local community ir required through an effective engagement and devolution of decision-making power, a facilitation of decentralisation and provision of a governance framework for the promotion of well-being, expansion of local production and consumption and widening of the local markets for exchange and barter common. On the infrastructure dimension, the pathway requires the initiation of the development of food, transport and energy infrastructure. The actions involved in this stage, include the development of local food systems and models of business practice at local level (food), investment in public transport and support for car sharing schemes (transport) and development of local renewable energy systems (energy), among others. This initiation incorporates public involvement in local activities and clubs that is motivated by organised groups and networks. On the Practices dimension, the pathway requires the initiation of the food, transport and energy practices. Better food practices, such as buying local and developing products made from energy efficient and environmentally friendly material (food), competent work conditions, such as teleworking when work not close to home (transport), and efficient houses, which retain the heat/cold and harvest rainwater (energy), are necessary. These practices can be implemented by campaigns that aim to raise awareness, stimulate the local reuse and recycling of components and materials, create enthusiasm around local activities (local eBay's, local tree planting, decentralization of materials recycling and reusing initiatives etc.), and inspire intergenerational interactions. This can be seen in the cultural dimension as a gradual appreciation and acceptance of local values espoused in the practices of people.

In Phase two of the pathway, the requirements on the Governance level, include the consolidation and relocation of governance based on which the community develops a plan for the integration of local sustainable food, energy/housing and mobility needs. Further in the Governance level, the pathway requires products and production reform, for making local production and consumption and home energy generation and insulation,attractive to everyone through the provision of incentives. It also requires the development of local power companies in every municipality and the amplification of household renewable energy generation, to support innovation. On the infrastructure side, it requires the roll out of food, transport and energy development. Tariffs based on road use, use of biofuels and fuel cells for transport, increase in household density and rural industry and development of local smart grids are only some of the measures that are to be taken in this stage. The acceptance of these measures will be stimulated through carbon allowances introduced by local communities and networks. On the practices side, the roll out of food, transport and energy practices involves an increase in vegetarianism, home-cooking and household food-growing in terms of food, as well as an increase in mobility by other means than car, working, living and shopping locally and holidaying in the country in terms of transport. In the area of energy, the roll out involves the communalisation of housing, among others. These practices foresee the elevation of collaborative consumption within people and networks, and the sharing of goods and services locally through the use of technological means.

In the third phase, the pathway requires the consolidation and relocation of budgets that will bring fiscal reform and will allow the siting of financial resources at local level, on the Governance platform. On the Infrastructure and Practices level, there is a continuation of the requirements set in the previous phase, due to the slow rolling nature of the activities involved in these dimensions.

In the fourth phase, the pathway requires an assessment of the distribution effects on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy development and practices, respectively.

iTech

The *iTech* vision pathway requires on the time interval between 2013 and 2015 the political support, collaboration and will, and the support of industry and innovation that will enable technological development and application for a sustainable living. Alongside these requirements rudiments on the Governance level, is education, which focuses into providing a deep understanding of the development and proper use of technology to the specialists and the public, through the use of social media. On the Infrastructure side, the initiation of food, transport and energy development necessitates the creation of public private partnerships that focus on social responsibility by organised groups and networks, and the development of new technologies through the initiation of strong partnerships between private and public sector that aim to give a rise at technological breakthroughs. Linking the IT sector with transport to increase its beneficial outputs and minimise the impacts of the existing high carbon technology, is a key requirement of the pathway towards a sustainable *iTech* vision. The initiation of food, transport and energy practices sees the development of meat substitutes and food pills to cover the needs of the ever increasing population and the ever decreasing resources wasted for food production, as well as the substitution of mobility for work related purposes with teleconferencing and teleworking. These initiatives, supported by organised groups and networks, foresee to increase awareness of resources security and to limit unsustainable energy use by the use of technological advancements.

On the second and third time intervals from year 2016 to 2025, Governance requirements lie on the consolidation or relocation of governance and the support of product production reform by developing global standards for food safety and imposing legislations for technological development. Also on the Governance side, the innovation support requires encouragement of households to install the latest energy generating and energy conversion techniques, and motivation of the local and national government to not only promote the development of technology for sustainable living but its use, too. The roll out of food, transport and energy infrastructure requires among others the production and testing of new food proteins, while networks promote carbon quotas to encourage the rolling. On the practices front, the roll out of food, transport and energy practices requires cultural acceptance of meat substitutes and demand for food pills (food), a car servicing and user-based systems (transport) and increased awareness to overcome aversion to technology and intensify its use by all, for increasing living standards in a sustainable manner (energy). For this to be achieved a collaboration between people is required to retain the trust of people in public-private partnerships and to succeed in updating the technological functioning of neighbourhoods.

In the final phase, the pathway requires an assessment of the distribution effects on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy development and practices, respectively. Particularly in the Infrastructure dimension, the development of an integrated public transport system and of a sustainable and reliable energy system is fundamental, whereas in the Practices dimension the pathway realises sustainability to be integrated into every aspect of everyday living.

Conclusions

The paper started by arguing that there is a prima facie case for the consultation, if not involvement of young people in the development of long-term visions and their corresponding pathways. This makes intuitive sense, as young people will live in these futures, and the assumption is that people who are involved in shaping change are often more willing to accept it, or, better still, are more enthusiastic about working towards such change. Such support is even more important when it comes to long-term change, where individuals will be required to change, or where deep, structural or radical change is required. Arguably, the threat of Climate Change and the change necessitated by the wider (and deeper) agenda of sustainable development would fit these characteristics well. From this perspective, new methodologies need to be developed to coalesce the need for expert input – to carry the complexities of the current situation as a basis for a realistic pathway towards future change – and the need for young people – to ensure the vision is actually carried by those who will (have to) live in these futures, or have to suffer the consequences of not attaining sustainable solutions for the "sticky problems" their previous generation will leave.

The paper then summarised the process stages of CRISP, where, firstly, young people from 6 EU countries were involved in first developing desirable futures of low-carbon, sustainable living within the sectors of household energy, individual mobility and food. Secondly, they were then collated and synthesised into three overarching visions. A second round of workshops of pupils as well as experts then produced chronological sequences of Plans of Action to develop viable pathways towards achieving these visions. This novel approach to the inclusive development of transition pathways has a number of significant implications:

Firstly, there is existence value in the transition pathways. They are at first hand no less complex or viable than other pathways that were developed. They may lack detail in comparison to others, such as Kok et al (2011), or Sondeijker et al (2006), but the authors found no reason why these visions should be discriminated against as viable trajectories for change. The task given in the workshops was, however, conducive towards wider, societal change, which runs counter to more sector-specific pathways (cf Foxon et al 2012, Eames et al 2010 etc) where greater detail require more technical knowledge. In this sense, brevity was an advantage in the design, but the requisite lack of technical detail may pose implementation problems. However, the project showed that young people were able to develop visions and pathways to attain them, and these workshop outputs were structurally no different from those of the expert workshops. As an aside, the comparison of the experiences between experts and lay people is explored elsewhere. However, pertinent to this debate is that the expert workshops to develop pathways were considerably more difficult to facilitate, primarily because experts' quality (and quantity) of contribution depended substantially on whether they tended to agree or disagree with the vision. Likewise, experts found it much more difficult to "think back from the future", especially when they were experts in the technical design of the status quo.

Secondly, as it is possible to develop such visions and pathways, the function of a process to develop transition pathways using experts only should be questions. The paper has started by arguing that low-carbon, sustainable lifestyles requires deep change of behaviour, which poses a prima facie argument that social change requires societal innovation and dialogue? If so, the role of experts is a changed one, towards a supportive, information-sharing role that is arguably subservient to the deliberations of others. The problem is, however, that workshops where experts and lay people are to work together very easily transcend into an expert workshop, as the technical knowledge held by experts

can shift the power to deliberate away from young people to their older experts. There are several possibilities to manage this, none of which has been explored.

Thirdly, the transition pathways followed a common dynamics, dovetailing the transition management framework broadly divided into 4 phases. Within this, there were a large number of activities that were shared between the pathways. This opens up two possibilities, one of which is that the visions are not that different from each other, the other is that the pathways that should lead to the visions are more comparable at the level of the proposed actions than the (diverse) visions would indicate. The authors suggest the latter, following reflections from the workshop panels that some of the activities "we should be doing anyway". If so, the logical conclusion is that some activities are germaine to change in the overall direction of low carbon, high sustainability lifestyles, and some activities shape the direction towards specific visions. It is thus likely that the "future we will end up with" is a combination of different pathways leading to somewhat different visions. If so, change becomes a blending process of pathways and visions, and this consideration leads back to the design and original purpose of the visions as crystallisation points for a public debate about which future "we" want, and how we should get there?

Fourthly, and finally, developing transition pathways over a period of only 17 years is a very challenging task. This is less because of timeframe is comparatively short, but because the scale of change at hand requires a fundamental and deep-rooted change which, in the eyes of most participants, is possible, but very radical. The question was raised whether society has the appetite for that kind of change?

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Discussant Contribution

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Introductory remarks

In this contribution I like to present some provocations, instead of mere questions, that were raised by the paperof this session. In my reading, both papers challenge some assumptions of existing frameworks in particular the multilevel perspective (MLP), transition management (TM) and participatory backcasting and with that they can help us to create further understanding and conceptual refining. With that one may say that both papers take some distance from, what can be called – between quotation marks –, the 'sustainability transitions-regime', and as such can be seen as fertile 'niches' in themselves.

Both papers also relate to what I find to be a crucial element of sustainability transitions, which is not the question *whether* these transitions take place, but *how* they will take place. In other words, sustainability transitions are inevitable in the energy domain, but the question is going to be *who owns them*? Given the depletion of resources and the effects of pollution, we cannot do anything else than change our ways of living and producing. It is my conviction that we are witnessing the start of a struggle over the discursive hegemony about the shape that these transitions will be given. In other words, there are several coalitions that try to connect the upcoming transition with their interests, ideas, norms, and expectations. For instance, companies in the energy domain are trying to find new ways to maintain their economic power, for instance by emphasizing the need to substitute oil and coal by low carbon resources such as natural gas (or shale gas) and nuclear power. In adition, one may see governmental efforts to upgrade the international energy networks for the transport of new forms of energy. A third perspective relates to local initiatives that use decentralized modes of energy production, not only to have eco-friendly forms of energy, but basically as a way to guarantee (some would say restore) the autonomy of civil society over governmental and economical systems that are thought to be too institutionalized and technocratic to warrant the primacy of civil society. This is also reflected in local resistance against the effects of the production and transport of power, just think of controversies in case of wind turbines, shale gas production, and electricity lines. Finally, we may also have a 'sustainability transitions-regime' that tries to own the notion of sustainability transitions by emphasizing the need for a decarbonized society, and the preference of small-scale initiatives ('niches') over institutionalized activities ('regimes').

Main discussion points on the paper by Avelino et al.

The paper offers a welcome deviation from much work in the field of sustainability transitions, which is often top-heavy in theory, while not being counterbalanced by empirical material – which causes the 'sustainability transition regime' to have some tendencies that can almost be called esoteric.

The empirical approach of the authors helps to overcome the good-bad scheme that can be recognized in the 'sustainability transition regime'. This scheme instructs us that niches are 'good' in the sense that they stimulate the uptake of sustainable technology, while regimes are 'bad' because they obstruct the uptake of sustainable technology. The cases presented in the paper, however, reveal first that regimes often actually provide drivers for niche initiatives, which proves that regimes are not as monolithic as often is suggested. Second, the cases reveal that niche initiatives do not have to be predominantly based on the stimulation of sustainable technology. Many of the niches that are presented here are motivated by other factors, most notably self-sufficiency, autonomy, and civic empowerment.

The authors introduce the concepts of 'niche-regimes' and 'undercurrent counter-movements' in order to highlight these phenomena. However, I am a bit reluctant whether there is a need for such additional labels, as I argued already, MLP and TM have the tendency to become conceptually and theoretically top-heavy. Sometimes, I fear that their conceptual toolkit obscures our analytical sharpness, and that it would be better to resist the urge to introduce additional concepts. On the other hand, I welcome any scholarly contribution that helps us to improve our understanding of the struggle over who owns the sustainability transition in the energy domain, as discussed above.

Main discussion points on the paper by Wehrmeyer et al.

The question that is (implicitly) addressed by this paper concerns the actual goal of participatory backcasting. My personal idea of backcasting is that it allows communication between regime players. The presence of a long term perspective that does not directly threaten any position can be used as a way to have meaningful interaction between actors with different (institutionally and organizationally given) stakes. This means that backcasting allows overcoming of societal boundaries, which, in turn, allows actors to engage in what is usually called *learning patterns*, while in fact these activities pertain to *unlearning* ingrained modes of thinking and doing.

The project that is presented in this paper turns this line of reasoning completely around. Instead of using backcasting to make people overcome the myopia of their interests, the project uses backcasting in case of people who have no institutional or organizational stakes at all. In other words, backcasting is used with a totally different goal in mind. The question can be raised, however, what the goal of backcasting in this project actually is. I have to say that this is not yet really clear to me. *Three* options may be shortly explored here.

First, the paper starts with the argument that generation Z has to be involved because they are the stakeholders of the future. To some degree, this claim connects to the issue raised at the beginning of my discussion. There are many coalitions that are going to fight over the discursive hegemony of sustainability transition. Most of them are deeply affected by this struggle, but only a few of them will have had a say at the end of the day. Young people can be seen as an additional stakeholder or coalition, possibly even the most affected by the outcome of this struggle, and also possibly the least influential. Hence, involvement of young people can only be seen as a laudable enterprise. The question, can then be posed whether the backcasting approach is the most appropriate method for empowerment. It may be contended that the role of participation in the method of backcasting basically targets learning *instead* of empowerment. This is because empowerment by participation demands some thorough requirements and design choices such as representativeness and the choice between a pluralist and a deliberative method, which backcasting does not

comply with. In short, using backcasting for empowerment may not be the most appropriate choice.

Using backcasting for educational purposes, the *second* option, might be a more legitimate choice (and reading the paper, the route that actually has been followed), however, I reckon that the relation between education and 'unlearning' still needs some further reflection. The *third* option would be to see young people as a 'niche', a societal section not hampered by entrenched interests that can come up with fresh new ideas challenging existing frames of mind.

Discussion Report

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Avelino and Franzeskaki presented ongoing research on the drivers and barriers of community self-organized infrastructure in general and energy supply in particular. They focussed on understanding community self-owned energy supply from a transition perspective. The research had an additional focus on grassroots innovation movements, looking at it through the lenses of the mulit-level-perspective and the strategic niche management approach. The guiding question was on how to go beyond both approaches to get to a complex transition perspective.

A core proposal in this regard is to add additional levels to the traditional three in MLP, the niche, regime and landscape. The authors introduced the concepts of 'niche regimes' and 'undercurrent countermovements' in order to highlight these phenomena. Pesch in his commentary challenged the need for additional labels, arguing that instead of introducing more concepts making the analysis more complex there should rather be an attempt to simplify the analysis and make it empirically more powerful and sharp. Avelino and Frateskaki defended the need for both new concepts, niche regimes and undercurrent countermovements, as to be helpful to particularly understand the origins and dynamics of regime changes. e.g. niche-regime or, relating to presentation from before, the individual level. If we want to understand more in depth, what are crucial elements of transitions it is useful to introduce these.

In addition there was debate on the sense of talking about drivers and barriers since both tend to shift depending on the person asked and on the timing in the process. Therefore e.g. the InContext project stepped back from talking about drivers and barriers. Avelino et al argue, that it is true that people may differ in deciding on what is a driver and what is a barrier (e.g. person a claims X to be a driver while b claims X to be a barrier.) and that this was observed in the empirics, too. At the same time this variation seems to shrink the more precisely you focus the question: a driver with regard to what exactly? In addition for the interviewees it did not prove problematic to decide on what is a driver or barrier.

An additional result possibly important to frame future inquiries pointed out the fact that people/ citizens do not relate their initiative to socio-techincal systems but rather to sub-cultural systems and along socio-spacial delineations. E.g. they would not talk about their initiative as being part of the Dutch energy system but rather to be part of the citizen self-owned energy movement.

Walter Wehrmeyer presented the CRISP project as well as preliminary findings from it. The project worked with young people in doing participatory backcasting and developing a variety of future scenarios. The presentation started with the insight that past experiences with expert assumptions on the future very often proofed to be essentially wrong. Wehrmeyer et al. therefore stress they need to experiment and play around, not focussing on one particular vision of the future alone, and backcasting is a means to do so in a structured way. Involving young people in backcasting and scenario development thereby follows at least to reasons: on the one hand there is an ethical argument to involve

young people as they are particularly the ones that are going to be alive during the time scenarios are made for. They should be able ot influence discussions and proposals. The second reason is related to this but more practical: Involving young people in backcasting about the future may lead to them owning results and behave in accordance to them.

A core part of the discussion focussed around the notions of desirability and plausibility of developed future scenarios. Trying to provide an answer to why sustainability transitions actually may or may not come about. Wehrmeyer put forth that although developed scenarios may be plausible they are not realized since they are not desirable enough, e.g. from the perspective of vested interests. An anecdotic insight reported was the strong reluctance of experts to work out scenarios that they did not feel were valuable, i.a. which they don´t like themselves. This led to challenging the basics and logics of these very scenarios. To the contrary young people were far more open to think through every kind of scenario.

A second focus point of the discussion as sparked by the comment of Pesch was on the key aims of the backcasting practices, be it learning or empowerment. Particularly he questions the adequacy of backcasting for aiming at empowerment of participants; rather learning would be a result more frequent in backcasting.

In his response Wehrmeyer pointed out, that one of the key advantages of backcasting is the social inclusiveness of the process, which makes the implementation of the pathways somewhat easier. However, there is also the difference between actual empowerment of decision-makers, and the feeling of empowerment individuals may gain from the backcasting process. It is right to suggest that empowerment would only be an outcome if the backcasting participants are actually also decision-makers, as opposed to the general public. Under this condition, learning is a more likely outcome in backcasting than empowerment, as many workshops are engaging with individuals or groups who are not necessarily in a position to enact their power towards change. Though Wehrmeyer made clear that he has no empirical evidence whether learning is a more frequent outcome than the feeling of empowerment.