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## Understanding and shaping spatial transformation processes through transdisciplinary case studies

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Moritz Engbers

## UNDERSTANDING AND SHAPING SPATIAL TRANSFORMATION PROCESSES THROUGH TRANSDISCIPLINARY CASE STUDIES

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### Abstract

A transdisciplinary case study focuses on a particular phenomenon in its social, cultural, economic and ecological context. *Transdisciplinary* means, first of all, that people from different fields – such as science, administration, art or business – conduct research together on socially relevant problems, learn from each other and develop interventions. Cases can be understood as boundary objects, which allow participants' perspectives to be identified and discussed. An approach to transdisciplinary research that is sensitive to differences can help to better understand and shape spatial transformation processes. In-between spaces that exist between disciplines, sectors, fields of work and living environments offer the potential to examine spatial processes from different perspectives and to question what is usually taken for granted as well as non-sustainable ways of thinking and acting. The conceptual contributions are illustrated using examples from a transdisciplinary case study in the district of Oldenburg with actors from science, art, the regional administration and civil society.

### Keywords

Difference – transformative research – sustainability – in-between spaces – experimenting and reflecting

### 1 Introduction

Global challenges range from climate change, unequal resource distribution and poverty to issues of social cohesion. Socio-ecological transformation processes are needed to address these problems (WBGU [German Advisory Council on Global Change] 2011) and to allow for changes in economic frameworks and lifestyles through interventions. Socio-ecological transformation processes have both a temporal and a spatial dimension. In principle, the idea is to develop approaches in the

dynamics between existing and becoming in order to viably and sustainably shape the relationships between society and nature (Becker/Jahn 2006). In recent times, the spatial dimensions of socio-economic transformations have received a great deal of attention (ARL [*Akademie für Raumforschung und Landesplanung*] 2016, Levin-Keitel/Mölders/Othengrafen et al. 2018). This includes questions pertaining to the comparability of local spatial developments, the significance of different scales and the effects of spatial dynamics such as migration or the concentration of capital. The German Advisory Council on Global Change (*Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen*) (WBGU 2011: 23) has spoken out in favour of responding to this socio-economic challenge with ‘transformative research’ that ‘promotes the redevelopment process through specific information, methods and technologies’. Unlike basic research or research about transformation processes, this transformative research is meant to have a greater impact on society. Transdisciplinary research can be understood as just such a transformative form of research. It aims to address real-life problems, promote cooperation between scientific and non-scientific fields and to actively include the values and interests of the various participants in the research process (Jahn 2008; Burger/Zierhofer 2007). One methodological approach of transdisciplinary research involves case studies in which various parties work on a specific case that is spatially and thus also socially, culturally and ecologically situated. This paper focuses on conceptual considerations that take advantage of the potential of transdisciplinary research to analyse and shape spatial transformation processes. The case is made for transdisciplinary research that is sensitive to differences, emphasising its contribution to spatial planning theory. The conceptual considerations are illustrated using examples from a transdisciplinary case study in the district of Oldenburg in Lower Saxony, in which individuals from the fields of science, art, the regional administration and civil society worked together.

## 2 Transdisciplinary sustainability research

Since the 1990s, approaches in transdisciplinary research with different focal points have been continuously developed and have become more differentiated. Transdisciplinary research can be understood as a field within sustainability research which is characterised by a normative orientation towards sustainability in which societal problems are the starting point and which involves a heterogeneity of actors from the field of science and other areas of society. Spangenberg (2011) describes this type of research as a ‘science of sustainability’ – as opposed to a ‘science for sustainability’ – which is characterised by transdisciplinarity, reflexivity and a practical orientation. This type of research is associated with discussions surrounding ‘Mode 2’ knowledge production (Gibbons/Limoges/Nowotny et al. 1994), which emphasises issues of increasing interaction between scientific and social practices. The following addresses a few central structural elements of transdisciplinary research, as they are discussed in sustainability research.

Transdisciplinary research starts by focusing on socially relevant, complex, difficult-to-define or ‘wicked’ problems (Pohl/Hirsch Hadorn 2006; Scholz 2011). One basic premise is that transdisciplinary research is meant to address problems that are relevant beyond science itself and that working on these problems requires the

knowledge of scientific disciplines and other fields of society. The creation of socially and culturally robust knowledge is seen as an important goal that emerges in a transparent and participatory process and is based on local conditions (Gibbons 1999; Nowotny 1999; Vilsmaier/Lang 2015).

In principle, there is a certain overlap when dividing transdisciplinary research processes into three phases. Lang/Wiek/Bergmann et al. (2012) describe phase A as the phase in which a problem is collectively framed and a joint research team is formed. In this phase, the problem is structured. Phase B includes the co-creation of solution-oriented and transferrable knowledge through cooperative research. This phase involves analysing the problem. In phase C, the mutually generated knowledge is integrated and applied with regard to the research objectives. What is paramount here is making the results productive by synthesising them and translating them into different fields of application. The phases are understood to be iterative and recursive (Hirsch Hadorn/Bradley/Pohl et al. 2006; Lang/Wiek/Bergmann et al. 2012). A further structuring element is the classification into knowledge types that are generated through transdisciplinary research. A distinction is made here between: 1) systems knowledge aimed at understanding the facts, 2) target knowledge to describe desired objectives and behaviours in terms of a need for transformation, and 3) transformation knowledge used to emphasise the means and ways of achieving objectives (Hirsch Hadorn/Hoffmann-Riem/Biber-Klemm et al. 2008). Ultimately, research principles are an integral part of transdisciplinary research that should act as fundamental principles or guidelines to orient the research process. Cooperation should take place 'on equal footing' where possible, responsibility should be evenly distributed across the research process and, regardless of the different roles and tasks, participating parties should work towards a common goal (Pohl/Hirsch Hadorn 2006; Scholz/Steiner 2015).

### 3 Transdisciplinary case studies

The structuring elements of transdisciplinary case studies are a focus on a particular problem, phases, types of knowledge and principles (Lang/Wiek/Bergmann et al. 2012; Pohl/Hirsch Hadorn 2006; Scholz/Tietje 2002). The aim of working on cases is both to find a solution to the problem in a specific situation and to generate knowledge that goes beyond the individual case (Krohn 2008). For this reason, context plays an important role in transdisciplinary sustainability research (Lang/Wiek/Bergmann et al. 2012). Unlike the relatively general understanding of cases in economics or sociology, cases in transdisciplinary research, according to Scholz/Tietje (2002), can be understood as specific phenomena in their historical context that are viewed from different perspectives and then strategically, socially and culturally framed. Because cases represent a specific phenomenon, it is necessary to precisely work out the specifics of each case. At the same time, cases exemplify a bigger issue. Generalised conclusions may thus be drawn by way of abstraction and can then be compared and contrasted with similar cases (Vilsmaier/Lang 2015).

According to Lang/Wiek/Bergmann et al. (2012), in phase A of a transdisciplinary case study a research team is formed, the problem is defined and a mutual understanding of the case is developed. A key question is also developed and

various methods of collaboration are established (e.g. rules of collaboration or guiding principles). In a collaborative research process, phase B involves discussing the case from various perspectives, which are characterised in regard to their (in) compatibility and are used to generate intervention strategies. In phase C the case is transformed, bringing together the different perspectives and translating the findings to different fields of application. When the knowledge types according to Hirsch Hadorn/Hoffmann-Riem/Biber-Klemm et al. (2008) are applied to a case, systems knowledge corresponds to understanding the case from different perspectives, target knowledge corresponds to a desired need for change focused on a central normative question, and transformation knowledge corresponds to the analyses, experiments and interventions carried out to fulfil the need for change.

Participants with different perspectives conduct research on the same case together. The researchers are 'situated' (Haraway 1988), in other words, they are shaped by their perceptions, scientific backgrounds, socio-cultural backgrounds, world views and previous experiences. This situatedness is not seen as an obstacle to the research; instead, making it explicit enables a better understanding of the researchers' basic assumptions, ways of thinking and interpretive models. Following Star and Griesemer (1989: 387 et seq.), cases in such research settings can be understood as *boundary objects* because they are compatible with different points of view and knowledge bases and they also enable a certain coherence beyond the individual points of view. One commonality is that all of the participants can associate a specific meaning with the boundary object. And because the participants come from very different backgrounds, these meanings may vary greatly. Due to the huge range of perspectives, boundary objects can bridge dichotomies between abstract and concrete or between specific and general. Burman (2009) stresses that boundary objects enable both the identification and differentiation of the perspectives. Particularities and nuances between the participants' perspectives become visible while the fundamental assumptions by which the perspectives differ also become apparent. The result is that a single case has a dual character: it makes differentiation possible by pointing out the participants' different perspectives on the case and at the same time it allows for integration by representing a reference point in the research process that can be reverted to time and again.

Initially, cases represent abstractions, which highlight different perspectives and make it possible to work on a transformation of the case (Vilsmäier/Lang 2015). Using the case as a boundary object, participants are faced with unusual or alien perspectives in the research process. They perceive their own perspective as increasingly relative and individualised, which has developed as a result of their socialisation, background and environment. By using the case to relate different perspectives to one other, a spatially and temporally situated phenomenon can be comprehensively described.

#### **4 The role of difference in transdisciplinary case studies**

The differences in the perspectives, knowledges and visions of the individuals involved are crucial to transdisciplinary research. However, it is clear that by focusing largely on

consensus, compromise and integration, the potential of exploring differences has not been realised (Engbers 2018). The same is true when it comes to examining the normativity of research (Schmieg/Meyer/Schrickel et al. 2018), the background of different conceptions of a given problem (Meyer 2020) and the questioning of power structures in the research process (Rosendahl/Zanella/Rist et al. 2015; Polk 2014).

Differences between the participants are not simply there, rather they are continually created and reproduced through the participants' own attributions and revaluations and those of others during the course of the research process. These self- and external attributions form regimes during the course of the research, through which individuals and statements are assigned to specific categories (Mecheril 2013). In this way, transdisciplinary research initially creates other relationships between individuals and ways of speaking, as is the case in empirical social research. This is firstly because individuals' roles towards each other change when all of the participants start to see themselves as researchers and secondly it is because adequate speaking and working methods, concepts and relevance only develop as a result of the heterogeneity of the participants. The way a transdisciplinary case study is organised, which settings are determined in advance, which ones develop during the process and whether they are understood in a static or dynamic way, also influences the relationships of the individuals to one another and the results of the research process. At the same time, this negotiation process provides the potential to shine a light on cultural regimes and things which are taken for granted from the backgrounds of the participants as well as on shared cultural regimes within society.

Difference-oriented thinking has consequences for the understanding of space. Bhabha (1994) uses the term 'in-between space', in which cultural differences, regimes and power structures are (partially) visible and can be experienced and negotiated. It is precisely in these in-between spaces, says Bhabha (1994), that the potential for individual and collective change lies. Difference is then not understood as static but rather as something that is in perpetual negotiation. One potential of transdisciplinary research lies precisely in creating the conditions to make such in-between spaces possible (at least temporarily) (Vilsmäier/Brander/Engbers 2017). Exploring cultural differences allows for a critical reflection as regards (implicit) basic assumptions and preferences, different ways of appropriating the world as well as the associated affiliations, values and norms.

## **5 Transdisciplinary case studies and spatial transformation processes**

Transdisciplinary case studies have a twofold spatial dimension: firstly, they make it possible to describe spatial relations and processes from the perspectives of the participating actors and secondly, they themselves represent material, social and cultural places where actors meet and – in the sense of in-between spaces – negotiate their individual perspectives. The two dimensions are mutually dependent.

Hofmeister/Scurrall (2006: 283) state that sustainable regional development requires a socio-ecological transformation of space: 'The awareness that we (help) produce "nature" and that we can negotiate about the 'nature' that we want with each other

opens up new spaces of opportunity for practical political action.’ That also means taking up concepts of space that do not lead to an over-determination of nature or society and understanding them as being related to one another and understanding ‘space’ as a ‘socio-ecological relationship’ (Hofmeister/Scurrall 2006: 278). This socio-ecological relationship can be understood more deeply thanks to the variety of perspectives held by participants in transdisciplinary case studies. Spatial comparisons made in order to identify ‘spatially-relevant powers [...] and to appreciate their reach’ (Vogelpohl 2013: 74) do not initially refer to different regions but rather to the comparison of different perspectives on the same case. The challenge and the potential lie in allowing not just one but different notions of space to exist alongside each other, which shape the perspectives of the participants.

Transdisciplinary case studies create in-between spaces when actors meet outside of their usual fields of work, sectors, disciplines and realms of life. Throughout the research process, material, social and cultural situations emerge in which researchers learn from each another, try out intervention strategies and negotiate preferences, values and norms. The quality of the interactions is also determined by the methodological design of the research process: Who should be involved in these negotiations, in what capacity and how? How should processes be shaped? Who makes this decision? The response to these questions is itself part of the research process. When power structures between actors are simply reproduced without thoroughly addressing their differences, the potential of transdisciplinary case studies for socio-ecological transformations can be lost. This may be the case, for example, when conventional constellations of participants come together or when long-established forms of interaction are not disrupted. That is why it is important to continuously reflect on the conditions of one’s own knowledge generation and to make jointly generated knowledge accessible to everyone.

According to Lefebvre (1991), spatial relationships and processes are both a prerequisite for and a consequence of social relationships. If other relationships between participating individuals are developed in a transdisciplinary case study and those relationships transcend the dichotomy between researchers and those being researched (Vilsmaier/Brander/Engbers 2017), there are consequences for the space-related results. In this sense, other relationships amongst individuals are also required to understand and create spatial transformation processes.

## 6 A transdisciplinary case study in the district of Oldenburg

In the following, a transdisciplinary case study is described in order to illustrate the discussion above. This case study was part of the international sustainability project entitled ‘Leverage Points for Sustainability Transformation’ at Leuphana University Lüneburg from January 2016 to March 2019 (funded by the VW Foundation and the Ministry for Science and Culture of Lower Saxony [*Niedersächsisches Ministerium für Wissenschaft und Kultur*]). As part of this project, the district of Oldenburg was defined as a case in which the topic of (bio)diversity and its interconnectedness was addressed using the concept of the ‘(bio)diversity corridor’. The objective was to find and make use of potential intervention points for sustainable development. The

district of Oldenburg is located in Lower Saxony between the cities of Oldenburg, Delmenhorst/Bremen and Osnabrück. A large part of the land is characterised by intensive, industrial agriculture, typical of the district of Oldenburg. Consequently, challenges in the region include a loss of biodiversity, increased nutrient inputs, pesticide loads and conflicts of interest between agriculture, tourism and nature conservation.

In the transdisciplinary case study, different groups of actors collaborated as part of projects, workshops and public events on the topics of biodiversity, nutrition, energy and agriculture. These included scientists from the Leverage Points project; artists from the artecology\_network association with a focus on art, culture and land-scape; representatives of regional and municipal administrations (including from the areas of nature conservation, climate protection, culture and the nature park); Master's students from Leuphana University and other actors from business and civil society. The collaboration focused on one key question that can be understood as the result of phase A and which was jointly developed in a workshop with the actors: 'How can (bio)diversity corridors in the district of Oldenburg nourish, promote and drive a sustainable and future-oriented way of life?' According to the artecology\_network, a (bio)diversity corridor represents bridges between human, animal and plant communities, ecological habitats and cultural meanings. Such a corridor should increase the awareness of climate protection and biodiversity as shared concerns, create an awareness of the region with its changes and the particularities of its landscape as well as promote neighbourly behaviour. Cultural and ecological diversity are seen as being of equal value according to this concept (artecology\_network e.V. 2017).

During the course of the research process (phase B), differences between the participants, which facilitated a better understanding of the case in different ways, became evident. This was manifested in the design of the workshops, the methods applied and the intervention strategies that were developed: at the beginning of the project, the scientists suggested lectures as a way to communicate knowledge, whereas the artists wanted to stimulate people to think by way of direct confrontation. Over time, a number of scientific and artistic projects developed, which were then realised in conjunction with different actors from the district. This included working with natural materials in workshops, researching 'favourite places' as special, personal places and evaluating artistic projects independently from scientific assessment criteria. On a particularly positive note, the scientists and artists worked together in tandem, researching similar topics using fundamentally different approaches. The question as to what nature is and how it can be researched, for example, came up again and again: analytical (conducting qualitative interviews), experience-based (describing and drawing cherished oaks) and experimental (cooking with invasive plants) approaches complemented one another.

As part of the (bio)diversity corridor, places developed that inspired people from the district to communicate and network during trade fairs, festivals and workshops. A special place was created using a project container, which represented a place to meet and communicate other than the established places. The (bio)diversity corridor represents a notion of space at the centre of the transdisciplinary case study that was



strategically developed during the course of the research and, in effect, filled with life. This proved to be a unifying strategy, making it possible to negotiate notions and ideas of space that bridge human and non-human nature, sectors and different ideas of nature and coexistence. Experimenting with the notion of the (bio)diversity corridor contributed to change by including more integrative viewpoints in the planning, bringing different people together to make decisions about spatial planning processes and finding intervention strategies for existing problem areas that run counter to existing systems of thought and behavioural patterns. The results of the transdisciplinary case study were included in a joint final publication for the district of Oldenburg, in which the different projects and approaches were reflected upon and related to one another (phase C). One key finding of the transdisciplinary case study was the connection between science, art and the regional administration. It was precisely the act of inviting the district administration to support artistic projects and to collaborate that led to a better understanding and reassessment of certain perspectives on spatial development. Through the concept of the (bio)diversity corridor, different ideas of diversity and diverse groups of actors could be related to each other.

## 7 Conclusions

Transdisciplinary case studies can expand the repertoire for reflection within spatial and planning science, and serve to develop and try out intervention strategies. By putting greater emphasis on the spatial dimension of transdisciplinary case studies, transdisciplinary sustainability research becomes more compatible with the strategies of spatial and planning science. In addition, the role of spatial processes can be given greater consideration in socio-ecological transformations. With the case as the methodological foundation, there is already a reference point for spatial comparisons and scaling to higher spatial and administrative levels.

Transdisciplinary research processes have a political dimension because the participants – including the scientists – do not act devoid of any interests; rather they bring certain aims and ideas about the world into the process. This research process presents an opportunity to uncover and process this normativity and thus the conditionality of one's own thinking and actions (Engbers 2018). This can be achieved in the research process by consciously questioning social structures (e.g. age, gender, ethnicity, dominant paradigms, socio-economic backgrounds) and by conducting open-ended experimentation and subsequently reflecting on it. These are preconditions that make it possible to change perspectives, negotiate meanings and develop a shared understanding of the problem. In this way, transdisciplinary research that is sensitive to differences and an exploration of in-between spaces can be pursued in an effort not simply to maintain an unsustainable present state but to develop alternative ways of thinking and acting to promote socio-ecological transformation.

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