

Learning in a Changing Climate:

Examining trans-municipal learning processes for sustainable urban planning

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Master Thesis Series in Environmental Studies and Sustainability Science,
No 2015:025

A thesis submitted in partial fulfillment of the requirements of Lund University
International Master's Programme in Environmental Studies and Sustainability Science
(30hp/credits)



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Lund University Centre for
Sustainability Studies



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Submitted May 13, 2015

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Abstract

Learning partnerships are becoming increasingly common for municipalities to fulfill their roles as important actors in adaptive governance regimes for sustainability. However, there is little theoretical guidance for municipalities, endangering the effectiveness of partnerships. The Ball-Bearing Framework used in this thesis is one of the first attempts to understand inter-municipal partnerships, but lacks wider application and theoretical grounding. Simultaneously, transdisciplinarity has emerged as a valuable research approach to provide socially robust knowledge for the solution of complex, societal problems. These two trends have resulted in an increasing need to understand trans-municipal partnerships. Taking a critical realist perspective, I therefore aim to improve the understanding of the generative mechanisms of successful trans-municipal learning. I do so by applying the Ball-Bearing Framework as well as the Lang et al. (2012) framework for transdisciplinary research processes on the trans-municipal learning partnership “Urban Transition Öresund”, and then integrating the two frameworks theoretically and empirically, following a mixed methods approach. Thus, my research contributes to the problem-solving aspect of sustainability science, to further the transition towards a sustainable society.

My findings show a strong overlap between the two concepts by enhancing each other and forming a more complete picture of trans-municipal partnerships. Especially the *Mutuality, Valuation and Reframing / Transformation* components of the Ball-Bearing Framework show strong, internal as well as interconnected, logical relationships that can be described with the Lang et al. (2012) framework. I argue that a clear methodological framework is highly important to achieve mutuality, valuation and reframing. Researchers can strongly contribute to reframing activities, but need to be integrated properly in the project structure. An unclear definition of roles and the subsequent wrong expectations as well as a lack of structures are the biggest hurdles to an effective trans-municipal cooperation. It is not only a challenge to integrate academia and practice but also various academic disciplines and different research paradigms, making it difficult to establish clear roles. In large, mixed research teams, inherent conflicts of interest make a mutual, transdisciplinary partnership challenging but ever more necessary to ensure valuation from all parties. With practice often still having a science-advice expectation, reframing needs to be clearly articulated as a project aim to avoid expectancy dissonances. Lastly, there is a conflict between the informal nature of reframing exercises and the necessity to produce formal outcomes for external dissemination. I conclude that these connections can be seen as generative mechanisms for successful trans-municipal learning.

Key words: Ball-Bearing Framework, Transdisciplinarity, Municipal Learning, Critical Realism, Urban Transition, Sustainability

Word count: 13,967

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Acknowledgements

On the first day of my Master's study, I remember the then-Director of Studies, Bodil Elmqvist, saying that we should start thinking about our Master's thesis now. It seemed funny at that point, the Master's thesis being some abstract assignment in the far future. With so many other exciting things to focus on in my time in Lund – both academically and in terms of the leisurely pleasures of a student life – it was probably the most important piece of advice she could give us. Now at the end of my study, and so much left to discover, it seems like I just started yesterday. It has been a great time and I would like to thank all who contributed to it, most of all my fellow students in LUMES and the dedicated people at LUCSUS.

This thesis would not have been possible without the great support, motivation and feedback from my supervisor, Henner Busch. Way to go, Henner! Moreover, I would like to thank Emily Norford and Jens Heidingsfelder for their critical feedback and encouragement. You rock!

I would also like to thank the Friedrich-Ebert-Stiftung, who have enabled me to pursue my Master's studies and contributed to my study experience with great seminars and discussions.

Thanks go to my family, who supported me at all times during the study and never got tired of hearing confused stories about what I am actually studying. In particular, I would like to say thank you mum and Hans, for providing a thesis writing retreat just when I needed it, and for always believing in me. Grandpa, I know that if you read this thesis, it is just to brush up your English skills... So before it gets too boring, I would like to say: Thanks for your support and stay as fun and happy as you are! This thesis is dedicated to you.

Without the very enjoyable common writing sessions, awesome dinners, and some good glasses of wine, the last few months would have only been half as fun. Therefore, I would like to say: All hail to the Vesterbros / Gunnesbros / LU-MO's!

Last, but certainly not least, I would like to thank Signe. If there is one person without who I truly could not have handed in a thesis, it is you. There are too many ways in which you have supported me to even try to list them all. I love you.

“We are not students of some subject matter, but students of problems. And problems may cut right across the boundaries of any subject matter or discipline.”

Karl Popper, 1963

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List of Abbreviations

UTÖ – Urban Transition Öresund
 BBF – Ball-Bearing Framework
 / (in interview quotations) – signals a break in the sentence

Effort for gender-neutral usage of language

In this thesis, person-related language refers to all forms of gender equally, even if not specified particularly in the text.

1 Introduction

Just recently, Steffen et al. (2015) found that the fourth of nine planetary boundaries, which set concrete limits to our planet's environmental capacity for long-term livability of the planet (Rockström et al., 2009), has been crossed. Climate change being one of the most urgent and important sustainability problems (Stern, 2007), a variety of political, economic and societal governance solutions have been identified and experimented with (World Bank, 2014; Transition Network, 2014). With little progress being made on the international level (Dimitrov, 2010), the local level has received more attention as an arena for transition (Rauken, Mydske & Winsvold, 2014; Roberts, 2008). Especially urban areas provide a suitable ground for transition, due to unique features of the urban system, such as rural and global interlinkages as well as a concentration of power, but also due to their often high risk regarding natural and human-made hazards and high consumption of resources (Wamsler, 2014; Birkmann et al., 2010). Urban spatial planning, as a key activity in the design of cities, is therefore vital in sustainability governance on a local level (Birkmann et al., 2010; Berke, 2002).

Throughout the 20th century, urban planning has evolved from its original aim, to steer and control urbanization, to take on contemporary challenges and started to acknowledge the need to plan for the future (Beall & Fox, 2009). Municipalities are important actors in the planning process, being responsible for implementing national policy and coordinating the process on a local level (Engelstoft, 2009). Municipalities have historical experience in solving environmental problems and often exercise far-reaching control over key emission drivers (Bulkeley & Betsill, 2005). Their proficiency as mediators in multi-stakeholder processes strengthens their mandate in transforming cities from drivers to solutions of sustainability problems (ibid). Additionally, local administrations have already proven to be strong supporters of the sustainable development agenda, considering the widespread support of the Local Agenda 21 (ibid). Moreover, national governments have understood the importance of local planning processes to reach their emission reduction goals (ibid), putting sustainable urban planning in the focus of national governments.

Sustainability problems often have contested and conflicting objectives and solutions, and, due to their urgent nature, need to be solved within tight timeframes. This requires effective management of solutions from the municipalities' side, which makes inter-municipal¹ learning highly important. With climate change already taking place (Intergovernmental Panel on Climate Change, 2013) and

¹ I use the term "inter-municipal" to describe practitioner-to-practitioner partnerships, while "trans-municipal" refers to partnerships that include both practitioners and researchers (see section 3.1).

the first resources expected to run out in the 2020's (Quick, 2012), and a simultaneously increasing global population (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2013), there is no time for mistakes. Learning processes between municipalities need to be designed in the most effective way so that the underlying conditions for successful sustainable urban planning are understood and can be adopted by other municipalities. Sustainability problems being global problems (Steffen, Crutzen & McNeill, 2007), learning from other municipalities is a reasonable endeavor. This is also reflected in the growth of city networks and reorientation of city sister partnerships aiming to support each other in achieving local and regional sustainability transitions (see e.g.: Covenant of Mayors, 2015; C40 Cities Climate Leadership Group, 2015; McLarty et al., 2014; Eurocities, 2013; Local Governments for Sustainability, n.d.). Understanding and being able to effectively design these learning processes is therefore crucial. Mendle (2013) and Mendle & Busch (2014) have laid the foundations for a framework that is to help urban planning professionals in exactly these tasks, called the Ball-Bearing Framework (BBF).

At the same time, transdisciplinarity has evolved as an important research strategy to manage sustainability problems and support a societal transition towards sustainability (Simon & Schiemer, 2015; Clark et al., 2011; German Advisory Council on Global Change, 2011; Hirsch Hadorn et al., 2006). Since the BBF implicitly draws on concepts of transdisciplinarity. It is therefore interesting to look into how these two concepts – one practical-oriented and one academic – connect them and see what synergies can be drawn out of their connection to improve trans-municipal learning.

1.1 Research Aims

I start my inquiry based on the assumption that transdisciplinarity is beneficial for the effectiveness of inter-municipal learning partnerships for sustainable urban planning, which is based on the simple observation that trans-municipal learning partnerships exist (see section 2.4). As I explain in the Methodology chapter, I apply critical realist, retroductive reasoning. This means, I want to find the generative mechanism of successful trans-municipal learning, by asking: *“How can municipal co-creation of knowledge for sustainable urban planning be fostered through transdisciplinary research?”* This translates into the following four research questions:

1. How can transdisciplinarity be integrated into the Ball-Bearing Framework?
2. In what way can Urban Transition Öresund be characterized through the lens of the Ball-Bearing Framework?
3. How did the transdisciplinary character of Urban Transition Öresund affect the partnership?
4. What are the consequences of this for the further development of the Ball-Bearing Framework?

Thus, I do *not* aim to give municipalities concrete advice on how to design a specific learning partnership, but to develop the BBF further in terms of transdisciplinarity. I begin this thesis with an outline of my methodology in the following chapter. To answer the first question I then review relevant literature on the BBF and transdisciplinarity (chapter 3). Based on this review, I theoretically integrate the two perspectives in section 3.3. I then analyze a trans-municipal partnership between Denmark and Sweden (*Urban Transition Öresund (UTÖ)*, see section 2.4) to investigate to what extent it fulfills the elements described by the BBF (section 4.1), thus answering research question two. As a second perspective, I analyze UTÖ from a transdisciplinary perspective by applying a framework for transdisciplinary research on the project, thus answering research question three (section 4.2). Based on both my findings and theory, I then discuss how the two frameworks can be integrated to develop the BBF further (research question four, see chapter 5). Together, the answers to each research question will feed into my overall research goal.

2 Methodology

In this chapter, I will describe and justify the process of conducting this study and show its connections to sustainability science. I begin by clarifying its ontological and epistemological rooting.

2.1 Ontology & Epistemology

I adopt a critical realist perspective for two reasons. First of all, in the social sciences it is difficult to find a theory that is universally true. If I would assume a non-critical realist perspective, I would hold my theory to be the only true theory, resulting in a rejection of all other theories (Chernoff, 2007). However, I take other theories as important inputs and cornerstones to orient and critically question my own research. Secondly, there is hardly any theory that has never been proven wrong in the history of science. Therefore, it would be encroaching to think that my theory would be true forever (ibid). While I believe that there is an objective reality, I do not assume that I can describe it. I see my research more as a temporary framing of a specific topic, trying to verbalize events in reality and the underlying mechanisms causing these events, overcoming a purely empirical level (Collier, 1994). As explained below, I do so through retroductive reasoning.

I apply retroductive reasoning in this thesis. Retroduction is similar to induction, but includes a reflective phase that inspires the formation of new and refined assumptions (Moses & Knutsen, 2012). In this thesis, I start with the assumption that transdisciplinarity has a positive influence on the co-learning processes in municipal partnerships, based on my review of literature on transdisciplinarity (see section 3.2). From this, I build my preliminary framework, refine it after having analyzed the results of the interviews, and give suggestions for further improvements (section 5.4).

2.2 Location in Sustainability Science

On the research agenda of sustainability science, I aim to contribute to the answer of two of its core questions:

1. “How can today's operational systems for monitoring and reporting on environmental and social conditions be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?” (Kates et al., 2001, p.642)

2. “How can today's relatively independent activities of research, planning, monitoring, assessment, and decision support be better integrated into systems for adaptive management and societal learning” (Kates et al., 2001, p.642)

Specifically, I am addressing the ‘how’ in these questions. Learning is an essential part of improving the performance of any system, and with this thesis, I aim to make these processes more effective. With municipalities being important actors in the management of environmental and social conditions, municipal learning is an important aspect of societal learning (see Figure 6, p.29).

By developing the BBF further, I contribute to a concrete framework that helps practitioners in urban planning to spread their knowledge so that other cities receive better guidance by the pioneering municipalities and can begin their transitional journey towards a sustainable operating mode. Furthermore, I hope to make transitions towards sustainability less of a daunting task for municipalities, knowing that they can rely on effective guidance while reflecting on the meaning of sustainability in their own context. By integrating transdisciplinarity in the BBF I support the integration of research and planning for municipal adaptive management.

Locating it in the sustainability science research matrix devised by Jerneck et al. (2010) (Figure 1), I want to contribute to the Pathways, Strategies and Implementation cluster, as it aims to both understand and solve sustainability challenges by operationalizing a societal transition. I take on a critical problem-solving approach. This means that my aim is not to critically question the municipalities or urban planning, but that I accept some institutions as necessary to achieve urban

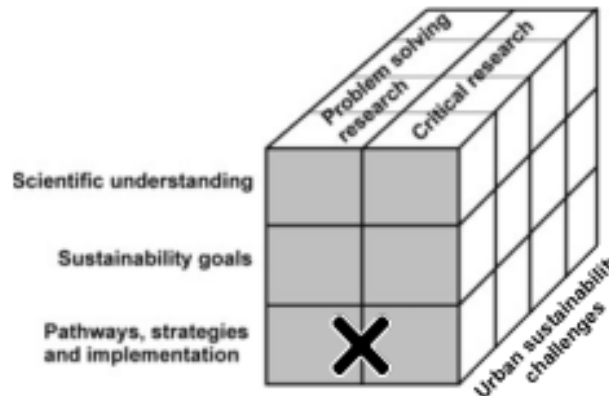


Figure 1. Locating my research in the sustainability science research matrix by Jerneck et al. (2010) (adapted)

transitions. However, I also contribute to theory development (Jerneck et al., 2010) by applying two frameworks that critically question the status quo and points towards improvements. Thus, this thesis critically investigates the improvement of learning partnerships that are designed to address any urban sustainability challenges.

2.3 Research Design

Having a critical realist perspective, I see a strong connection between my study object and the context in which it exists. Therefore, I designed this thesis as a case study, with the unit of analysis being municipal partnerships in the Öresund region, exemplified by UTÖ.

I chose a case study because the kind of deep illumination of the specific context would not be achievable with, for example, a cross-sectional research design (Bryman, 2012). Based on Scholz & Tietje's (2002) understanding of a case, UTÖ is a good case for this study, because it is a specific form (trans-municipal learning partnership) of a general problem (learning for sustainability). It can be considered an exemplifying case because it provides "an apt context" (Bryman, 2012, p.70) for applying my research questions. Thus, it serves the research aim of uncovering the conditions of successful trans-municipal learning for sustainable urban planning. The BBF being a fundamentally constructivist framework (Mendle, 2013), I necessarily operate on the premise that learning is contextual. However, from my critical realist standing, I have the possibility to integrate the underlying relations between "learning environments, educational knowledge and the interior world of the learner" (Kahn, Qualter & Young, 2012, p.860) and not only focus on social / power relations or psychological factors of learning.

2.4 Case: Urban Transition Öresund

UTÖ was a cross-border municipal learning project in the Öresund region to foster the development of new approaches to sustainable urban planning². It had a timeframe of three years, from October 2011 to September 2014. It involved five municipalities and five universities from the Danish and Swedish sides of the Öresund region (see Figure 2). Appendix I depicts a list of the project partners.



Figure 2. Map of the Öresund region and participating municipalities (pins). Used with permission by Öresundskomiteen. Own modification.

The project was co-financed by the project partners and received funding from the European Union’s INTERREG IV-A program (APPL_UTÖ). The formal aim of the project was “to find new innovative solutions and strategies for sustainable urban development” (Urban Transition Öresund, n.d. a, p.2) in four major activity groups, which are: (1) sustainable planning processes, (2) guidelines for sustainable construction, (3) sustainable finance, and (4) new forms of collaboration. It was geared towards urban planning professionals within municipalities, but also included research institutions and private sector actors (APPL_UTÖ). The project produced very concrete results in these four areas, as listed in Appendix II. Apart from field visits in different municipalities, the project

² For more detailed information I refer to the project website: www.urban-transition.org

also featured six larger fora (“Urban Transition Forum”) on each of the themes, including an introductory and concluding conference.

2.5 Methods

My ambition to work as transdisciplinary as possible is reflected in several aspects. First, the BBF is a framework designed for practitioners and has been developed with and by practitioners according to their needs and is used by the association Local Governments for Sustainability (H. Busch, Personal Communication, March 6, 2015). Connecting the academic idea of transdisciplinarity with a practitioners’ framework is transdisciplinary work at its very core. This means that this thesis has both a practical as well as a theoretical ambition, creating knowledge that can be reintegrated in practice and academia. By interviewing practitioners as well as researchers I want to uncover the perspectives of both parties.

In this transdisciplinary line of thought, I follow a mixed methods approach to break down the quantitative-qualitative divide of my findings. The beginning of the data collection process is marked by the distribution of an online evaluation questionnaire of UTÖ. This was the official, final evaluation survey of the project, thus allowing me to get an overview of general indicators with the satisfaction of the project. The survey allows for a more complete picture, because it extends the sample from eight (qualitative interviews) to 25 in a project size of around 50 active participants in UTÖ. It allows me to see the statements of the in-depth interviews in a context, adding to the completeness of the results and allowing some degree of triangulation (Bryman, 2012; Silverman, 2005). I also analyze some internal (see List of Documents) as well as some externally available documents (see References).

For the interviews, I use purposive sampling, since I want to tap knowledge of people who have something to say about the project and their learning experience. The survey therefore formed the basis of my sampling for interview partners, who I selected on the uniqueness and insight of their comments in the survey. In my choice of interviewees I aimed for a composition of 1/3 researchers and 2/3 practitioners as well as 50% Swedish and 50% Danish³. The reason for focusing on the practitioners’ viewpoint is simple: They are the ones to implement and realize a transition, so it is important to understand how they see transdisciplinarity. Taking transdisciplinarity theory into account, I chose interviewees so that a wide variety of educational backgrounds would be represented, to account for the multiple views there might be within each occupational group.

³ Since the project emphasized the cross-border aspect it would have been ignorant to only interview participants from one country.

Seven of the eight interviewees work at different municipalities / universities, meaning that a variety of voices from different participating organizations with different contexts is heard. For an overview of the sample please refer to Appendix III. In order to ensure anonymity, I chose not to list the interviewee's organization (see section 2.6). All interviews were held in English. For the interview guide please refer to Appendix V. The interviews can be seen as expert interviews because the participants of the project have undergone (or not undergone) a learning process and are thus experts by experience for trans-municipal learning (Meuser & Nagel, 1991). Moreover, in their position as urban planners and researchers, they are important agents in the process of transforming the Öresund region. Lastly, they have privileged access to information regarding the partnership (ibid).

In total, I gathered 484 minutes of audio recordings. The interviews were transcribed using simple transcription rules (see Appendix IV) and analyzed using the program "MaxQDA". For the analysis of the data, I constructed codes and categories derived from the BBF and the Lang et al. (2012) framework for transdisciplinary research. This means that I used codes for each framework independently of the other. Next to the predefined codes, I also applied open coding to find possible topics outside of the frameworks. I cross-coded the interviews in order to ensure consistency if new codes were found through the open coding process. I then applied focus coding to integrate them with or expand the predefined codes (Charmaz, 2006).

I grouped my results and analysis together, because the qualitative interviews I conducted are analytical by uncovering the underlying factors of trans-municipal learning. Moreover, the frameworks that I apply are analytical, as they generate "a careful study of something to learn about its parts, what they do, and how they are related to each other" (Merriam-Webster, 2015).

2.6 Ethical considerations

As I aim for co-production of knowledge, I do not see my interviewees as mere research objects (Reimer et al., 2012). Therefore, I follow a semi-structured interviewing approach that allows the participants to tell their own story. To avoid a negative perception of my research in the project, I coordinated my research with the project management. Both the survey and the interviews were voluntary and anonymous, which is why I use anonymized codes to reference quotes (see Appendix III). The participants were informed in advance what the data would be used for and what my background is. The interviews were recorded only after explicit verbal confirmation of the interviewee.

2.7 Limitations

With my research being a case study and based on purposive sampling, I naturally limit the external validity of my findings (Bryman, 2012). The project, despite being called Urban Transition *Öresund*, is comprised only of institutions from the Danish island of Sjælland and the Swedish region of Skåne (see section 2.4).

Since participation in my research was voluntary, I could not perfectly fulfill all of the aforementioned sampling criteria (see Appendix III). To ensure a critical perspective, I aimed to have a sample with an average satisfaction of lower than 2.0. However, it proved impossible to reconcile this with the other sampling factors and would not have represented the average satisfaction of participants (see section 4.1.3). The voluntary participation and sampling method may have also caused a bias, in the sense that I did not speak to participants who dropped out, or were frustrated with the project. Furthermore, my sample does not depict all working groups within UTÖ, as it was not possible to recruit interviewees who fit my criteria in all working groups.

The fact that I am working alone, not in a research team, and that I am not part of a shared research process that is owned by both practitioners and academia puts limits to the degree of transdisciplinarity of my work (see section 3.2). This is due to the structural limitations of a Master's thesis. To compensate for this to some extent, I chose semi-structured interviews (see section 2.5). The quantitative analysis of the interviews is still based on my subjective interpretation of the interviews, i.e. my coding process. Moreover, the different length of interviews can bias the coding and the quantitative analysis. The average length of interviews was 56 minutes with a standard deviation of 24 minutes.

3 Theory

In this chapter I first present the BBF and its background. Second, I introduce the concept of transdisciplinary and a framework for transdisciplinary research, leading to the final section of the chapter, which clarifies the connections between the two concepts. This is important because the BBF is not explicitly informed by the concept of transdisciplinarity, but as will be shown in this chapter, it implicitly draws on it and the connections should be made clear to ground it more firmly in sustainability science. Together these concepts form my analytical lens for the case.

3.1 The Ball-Bearing Framework

To understand why the BBF was developed, it is important to see it in the bigger picture. Notions of a limit to rationality (Simon, 1957) strongly influenced the development of complexity science and the idea of the existence of complex, adaptive systems (Heylighen, Cilliers & Gershenson, 2007; Lansing, 2003) and subsequently resilience (Becker, 2014). Simultaneously, the inability of current governance regimes to respond to sustainability challenges, which are often conceptualized as complex adaptive systems, gave rise to the concept of adaptive governance (Ostrom, 2009; Folke et al., 2005; Ostrom & Janssen, 2002; Holling, 2001; Cilliers, 2000).

Adaptive governance is a concept similar to strategic spatial planning (Frommer, 2009; Birkmann, Garschagen & Setiadi, 2014). It acknowledges the need for constant adaptation of governance regimes through continuous learning and reflection of the actors directly or indirectly involved in or affected by the governance process (Pahl-Wostl, 2009). Furthermore, it argues that polycentric governance regimes that balance formal and informal institutions, as well as top-down and bottom-up approaches lead to higher adaptive capacity and thus sustainability (ibid). Other key features of adaptive governance are the importance of informal networks or self-organization and the collaboration of diverse stakeholders. In total, these ultimately lead to increased flexibility to react to sudden changes and increased effectiveness and legitimacy through participation (Folke et al., 2005; Lundqvist, 2004).



Figure 3. The Ball-Bearing Framework. (Mendle & Busch, 2014)

It is in the light of adaptive governance and organizational and social learning that Mendle (2013) developed and formalized (Mendle & Busch, 2014) the Ball-Bearing Framework For Trans-Municipal Learning. Contrary to the term inter-municipal cooperation, which refers to the collaboration of two or more municipalities to provide a public service (Hulst & van Montfort, 2007), trans-municipal cooperation is less well defined. In the BBF, it refers

to the transformational character of the knowledge it aims to foster. In order to clarify this understanding, I turn to the definition of inter- and transdisciplinarity from a sustainability science viewpoint: interdisciplinarity is an integrated research cooperation between various academic disciplines, and transdisciplinarity is the cooperation of multiple academic disciplines and non-academic actors (Stock & Burton, 2011). Therefore, I define “inter-municipal” as practitioner-to-practitioner municipal partnerships, while I use “trans-municipal” to describe municipal partnerships that include both practitioners and researchers.

The BBF is more than an evaluation of municipal co-learning processes. It is action-oriented, as it aspires to guide the design and implementation of inter-municipal partnerships by aiding practitioners to identify, improve and rectify strengths and weaknesses of learning partnerships between municipalities (Mendle & Busch, 2014). The framework is normative as it aims to support the creation of not only additive but transformational knowledge (see: Schugurensky, 2000). It consists of five elements that are constituent to the success of inter-municipal learning partnerships: (1) Mutuality, (2) Communication, (3) Valuation, (4) Dissemination, and (5) Reframing⁴. Importantly, these elements do not stand for themselves but are interconnected (Mendle & Busch, 2014). In the following, I will describe the elements of the BBF in detail.

⁴ The numbering does not indicate a sequential order.

3.1.1 Mutuality

Mutuality means that there needs to be an open, two-way relationship, recognizing all partners as being on the same level, avoiding a teacher-student relationship (Mendle & Busch, 2014). In this regard, Johnson & Wilson (2006, p.73) have coined the characterization of “difference that drives mutuality”. A teacher-student relationship, which implies unequal power relations, constitutes a form of dominance that is detrimental to the aim of creating transformational change (Mendle & Busch, 2014).

3.1.2 Communication

The element of communication refers to dialogists having to be able to understand grammatically what the other says in order for meaningful dialogue to take place, which requires speaking the same language (Mendle, 2013). However, since the BBF is built on a constructivist understanding, it also refers to cultural understanding, asking: “What does the other want to tell me with his/her words?” (Mendle & Busch, 2014, p.3). Practically, these issues translate into the need to define common vocabulary, explicate concepts and ideas and in general prepare and train participants to develop a shared language and understanding (Mendle & Busch, 2014; Mendle, 2013).

3.1.3 Valuation

Mendle & Busch (2014) state that the partnership and participation in it need to be valued both internally and externally, in order for outcomes to have a lasting impact. While the BBF is vague about internal valuation, it is clear about external valuation: it can take the form of formal acknowledgement like certificates as well as budgeting time for participation in a partnership, ensuring that the employee does not have to work on the partnership on top of her other tasks (ibid). In other words, knowledge needs to be appreciated in order for it to be used effectively. Therefore, external valuation from superiors and colleagues outside the partnership is highly important, which links to the next element: dissemination.

3.1.4 Dissemination

Spreading knowledge gained from a partnership is highly important if the project is to have an impact on a wider circle of people and organizations, which to some extent depends on the hierarchical position in the organization of the individuals taking part in the partnership (Johnson & Wilson, 2006). However, to do so it is first necessary to distribute the knowledge within the partnership to all participants, for example through lectures or for a (Mendle & Busch, 2014). This

does not mean that everybody should have the exact same learning outcomes, but that a common basis for interpretation and discussion should be established.

3.1.5 Reframing⁵

This element clearly relates to the ideas of adaptive governance, in particular the framework of Pahl-Wostl (2009), highlighting the creation of transformative knowledge through partnerships (Mendle, 2013; Mendle & Busch, 2014). Thus, partnerships should allow for creative, individual and collective reflection to not just

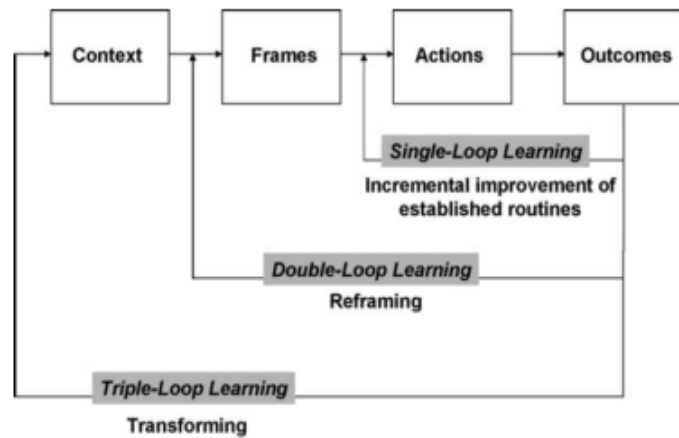


Figure 4. Visualization of Single-, Double- & Triple-Loop Learning. (Pahl-Wostl, 2009)

improve the efficiency on what they are working with, but also question if and why that is the right thing to do (Mendle, 2013; Tosey, Visser & Saunders, 2012). Reframing occurs if a double, respectively triple loop learning cycle becomes activated (Pahl-Wostl, 2009).

3.2 Transdisciplinarity

Transdisciplinarity is a research approach in sustainability science usually associated with the problem-solving aspect (see section 2.2). However, transdisciplinarity is also necessary to critically examine the root causes of sustainability problems. It assumes that our understanding of a problem is refined and ultimately better if analyzed from different perspectives and when different viewpoints are integrated (Thorén, 2015), relating to knowledge as a social construction (Moses & Knutsen, 2012). Therefore, sustainability science understands itself as a gap-closer between academic disciplines and attempts to co-create knowledge with practitioners in order to practically solve sustainability problems. This understanding also rests on the wicked (Rittel & Webber, 1973) and complex (see section 3.1) nature of the sustainability problems (Jerneck et al., 2010).

Transdisciplinarity can thus too be traced back to the notion of complex, adaptive systems and the need for adaptive management (Folke et al., 2005; Mackinson & Nøttestad, 1998). Typical features of such systems are increasing stakes and uncertainty of implementing scientific developments. In such conditions, traditional science with its focus on producing scientifically reliable knowledge

⁵ Mendle & Busch (2014) use both the term “Reframing” and “Transforming” for this element. For readability reasons, I only refer to “Reframing”, even though both terms are meant.

cannot fulfill the expectation of society to develop socially robust knowledge (Scholz, 2011; Gibbons, 1999; Funtowicz & Ravetz, 1993). Socially robust knowledge can be described as knowledge that is relevant for society (saliency), legitimized through transparent, participatory production-processes (legitimacy) that at the same time follow established rigorous academic scrutiny (credibility) (Cash et al., 2003; Gibbons, 1999). Since these three dimensions are often conflicting (Cash et al., 2003), the management of such boundary processes (between science and society) becomes highly important and needs to be facilitated (Brundiers & Wiek, 2010). Scholz (2011) identifies four functions of transdisciplinarity, which are: (1) capacity-building, (2) consensus-building, (3) analytic mediation, and (4) legitimization. These partly overlap with the three dimensions of socially robust knowledge (Saliency, Legitimacy, Credibility), but are more functional as the name indicates. Moreover, the legitimization function of Scholz (2011) explicitly refers to the area of tension of legitimizing policy through science.

The integration of different types of knowledge – experiential and different kinds of scientific knowledge – is central to the idea of transdisciplinarity, as opposed to interdisciplinarity, which only integrates different academic disciplines (Lang et al., 2012; Scholz, 2011). Moreover, it is important to understand that transdisciplinarity is not a static code, but rather a process that is constructed and performed by the participants (Streule, 2014). As a social process it fosters normative discussions by making values and norms explicit (Hirsch Hadorn et al., 2006). This includes the role and significance of scientific knowledge in societal problem-solving that requires social, economic, institutional and technological solutions (ibid). This is also the case for complex sustainability problems (Scholz, 2011), including those in the urban arena (Woiwode, 2013; Hirsch Hadorn et al., 2007). Transdisciplinarity is therefore “a development in response to a modern problem – that of the need to address complex problems with equally complex knowledges while, simultaneously, avoiding excluding the contribution of the alternative knowledges of those who are directly embedded in the issue” (Stock & Burton, 2011, p.1100).

There are also critical voices on applying transdisciplinarity as a *carte blanche* in urban planning and research, warning that it might reduce the scientific method to a tool and produces an unidentifiable mixture of methodologies with consequential disappointing results (Streule, 2014). Thus, without fundamental epistemological understanding, the credibility of the knowledge generation process may be decreased. Therefore, transdisciplinarity must be reflexive and researchers involved in transdisciplinary research processes need to critically examine their own theoretical rooting, since there might be less scientific peers and a greater inclination of practitioners to accept the ‘opinion of science’ represented by the scientists (ibid).

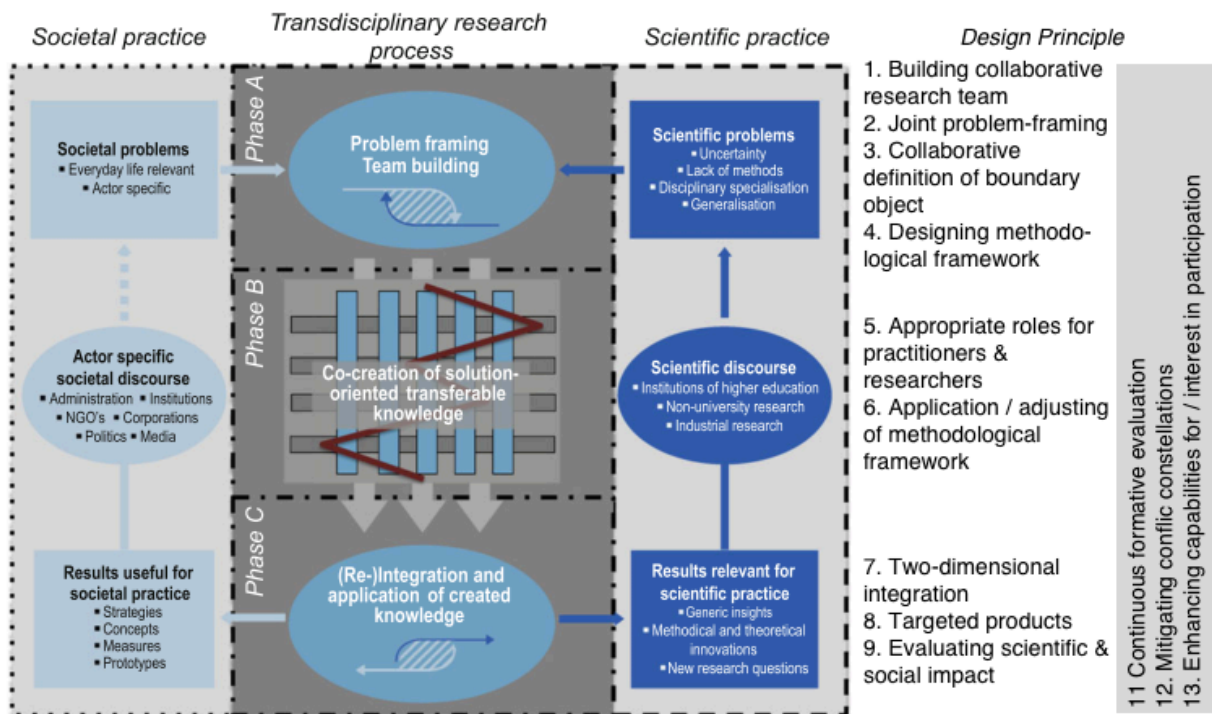


Figure 5. Conceptualization of an ideal-typical transdisciplinary research process, including design principles to realize such a process, grouped by phases. Principles 11-13 are crosscutting and apply in all phases. Adapted from Lang et al. (2012).

Nicolescu (2005) acknowledges Jean Piaget as having coined the term “Transdisciplinarity” first in 1970. By now there are various different interpretations of transdisciplinarity, of which Scholz (2011) has given a good typology. Lang et al. (2012) have given a highly influential definition in the context of sustainability, defining transdisciplinarity as “a reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge” (pp.26-27). This thesis will draw strongly on their definition and framework of transdisciplinarity, because it is widely accepted⁶ and provides a highly applicable and comprehensive review of transdisciplinarity in sustainability science.

It is beyond the scope of this thesis to explain their framework in detail, but in the following I give a brief summary. Lang et al. (2012) identify three phases in a transdisciplinary research process. The first phase can be characterized as the preparations and introduction to the actual transdisciplinary research that takes place in the second phase. In the third phase the commonly produced knowledge is reintegrated in academia and practice. To design such a transdisciplinary research process, they suggest 12 principles, which follow each other in a logical sequence (see Figure 5) and are described in more detail in Table 1.

⁶ Cited 206 times in Google Scholar, 88 times in Scopus and 89 times in Web of Science as of 11/05/2015

Table 1. Design principles in transdisciplinary research and respective guiding questions (Lang et al., 2012).

Design Principle	Guiding Question
Build a collaborative research team	Does (did/will) the project team include all relevant expertise, experience, and other relevant “stakes” needed to tackle the sustainability problem in a way that provides solution options and contributes to the related scientific body of knowledge?
Create joint understanding and definition of the sustainability problem to be addressed	Does the project team reach a common understanding of the sustainability problem to be addressed and does the team accept a joint definition of the problem?
Collaboratively define the boundary/research object, research objectives as well as specific research questions, and success criteria	Is a common research object or guiding question, with subsequent specified research object and questions, formulated, and does the partners agree on common success criteria?
Design a methodological framework for collaborative knowledge production and integration	Does the project team agree upon a jointly developed methodological framework that defines how the research target will be pursued in Phase B and what transdisciplinary settings will be employed? Does the framework adequately account for both the collaboration among the scientific fields and with the practice partners?
Assign and support appropriate roles for practitioners and researchers	Are the tasks and roles of the actors from science and practice involved in the research process clearly defined
Apply and adjust integrative research methods and transdisciplinary settings for knowledge generation and integration	Does the research team employ or develop methods suitable to generate solution options for the problem addressed? Does the team employ or develop suitable settings for inter- and transdisciplinary cooperation and knowledge integration?
Realize two-dimensional integration	Are the project results implemented to resolve or mitigate the problem addressed? Are the results integrated into the existing scientific body of knowledge for transfer and scaling-up efforts?
Generate targeted products for both parties	Does the research team provide practice partners and scientists with products, publications, services, etc. in an appropriate form and language?
Evaluate scientific and societal impact	Are the goals being achieved? What additional (unanticipated) positive effects are being accomplished?
Facilitate continuous formative evaluation	Is a formative evaluation being conducted involving relevant experts related to the topical field and transdisciplinary research (throughout the project)?
Mitigate conflict constellations	Does the researchers/practitioners prepare for/anticipate conflict at the outset, and are procedures/processes being adopted for managing conflict as and when it arises?
Enhance capabilities for and interest in participation	Is adequate attention being paid to the (material and intellectual) capabilities that are required for effective and sustained participation in the project over time?

3.3 Locating Transdisciplinarity in the Ball-Bearing Framework

To answer the first research question, I locate the intersections between the BBF and the Lang et al. (2012) framework for transdisciplinary research, depicting where notions of transdisciplinarity can be located in the BBF (see Table 2). The integration is structured according to the five elements of the BBF, but since many aspects are interconnected between various elements, I will also make cross-references.

Table 2. Intersection of the BBF with the Lang et al. (2012) framework. Column headings are the five elements of the BBF. Principles are ordered according to the logical sequence in the Lang et al. (2012) framework. Eventual crosscutting principles are at the bottom of a column.

Mutuality	Communication	Valuation	Dissemination	Reframing
Collaborative teambuilding	Team-building	Joint problem-framing	Two-dimensional integration	Joint problem-framing
Joint problem-framing	Methodological framework for collaborative knowledge production & integration	Collaborative definition of boundary object	Targeted products	Collaborative definition of boundary object
Collaborative definition of boundary object	Conflict mitigation	Methodological framework for collaborative knowledge production & integration		Methodological framework for collaborative knowledge production & integration
Methodological framework for collaborative knowledge production & integration		Appropriate roles		Appropriate roles
		Two-dimensional integration		Evaluation of scientific & social impact
				Formative evaluation

3.3.1 Mutuality

A clear intersection with the BBF occurs in regards to the aim of transdisciplinarity. According to Lang et al. (2012), transdisciplinary research must foster “mutual and joint learning processes” (p.27). This formulation even shares the same vocabulary of the mutuality component of the BBF (Mendle & Busch, 2014). It is a crucial foundation for the rest of the process to build a balanced, collaborative, transdisciplinary research team based on transparent selection criteria that includes relevant stakeholders of a preliminarily defined problem area (see Table 2). Moreover, this team should come to a mutual understanding of the problem that is to be solved. Since the research should be logically dependent on the problem definition, there is a danger that if participants perceive that they are trying to tackle the “wrong” problem, their valuation of the process and outputs may decrease. At the same time, a balance between problem-solving and critical research that inspires reframing needs to be kept. This leads right to the next point of collaboratively defining the boundary object that is to be researched and a definition of the success criteria of the project, which also needs to be done in a mutual way for the same valuation reasons as the problem definition.

To further foster mutual cooperation, Lang et al. (2012) suggest to design a methodological framework in the beginning of the collaboration, describing the ways of generating and integrating knowledge, through a tight integration of research questions and method development. Respecting the different aims of practitioners and researchers (solving a real-world problem versus adding to the scientific body of knowledge), means that both the practitioners' applicability requirements as well as the scientists' rigor need to be respected in the process (ibid). Lang et al. (2012) further elaborate that through for example peer-review pairs comprised by participants of different disciplinary backgrounds, comprehensibility of knowledge towards uninvolved people is increased, which plays into the communication aspect. Devising a methodological framework is connected to the mutuality aspect, because it supports relations that are free of domination. In fact, such a framework is highly important for almost all BBF components, as it guides the implementation of the research activities, defining roles and usage of the generated knowledge (see Table 2).

3.3.2 Communication

Both concepts also share the idea of developing a common language, so that all parties in the process understand what they are talking about. This obviously involves speaking the same language but also includes, as mentioned above, a common interpretation of terms and formulations used in the project (Mendle & Busch, 2014; Mendle, 2013; Lang et al., 2012). Forming a balanced, transdisciplinary team (see section 3.3.1), supports the realization of this principle as it allows for the establishment of a mutually understood boundary object (Lang et al., 2012).

Having a clear framework how the different perspectives of the various participant groups can either support or obstruct communication in the project (see Table 2). Part of this can also be appointing a trans-academic interface manager (Brundiers & Wiek, 2010), who is a neutral person who can facilitate discussions to integrate "so-called 'facts' with values, deals with power relationships, and mediates differences in the perspectives and aspirations of academics and practitioners" (Brundiers & Wiek, 2010, p.112 [original quotation marks]) and thus translate between the participant groups. This can be integrated under the point of teambuilding and conflict mitigation.

3.3.3 Valuation

A collaborative problem / boundary object definition and the subsequent design and implementation of a methodological framework around the problem / boundary object, may also increase the valuation of the project by participants. If participants feel that they are looking at the wrong problem or wrong methods are applied for the analysis of the case, this may lead to dissatisfaction (see section 3.3.1). This is very much connected to achieving a balance between salience and

credibility, so that both practitioners and researchers get meaningful results based on the choice of methods. It is also important that the participants feel that they fulfill an appropriate role in the project, in order to stay motivated (see Table 2). Due to different methodologies in different academic disciplines, different researchers may aspire to fulfill different roles in the process, from a consulting role to critically questioning the work of the practitioners. Making roles clear from the beginning may avoid frustration among both researchers and practitioners, so that practitioners do not feel like a lab rat or scientists as a mere accessory to legitimize policy (see section 3.2). To appreciate the process as a whole, two-dimensional integration (Lang et al., 2012) of the knowledge needs to be taken care of. This means that the outcomes are reintegrated into practical processes, or respectively the academic body of knowledge, by reviewing the generated knowledge based on the different needs of each sphere (salience / credibility) (Bergmann et al., 2005).

3.3.4 Dissemination

Valuation also concerns the dissemination element of the BBF. Proper dissemination as the BBF defines it is only possible through two-dimensional integration and subsequent production of targeted products for scientists and practitioners (Defila, Di Giulio & Scheuermann 2006) (see Table 2). Two-dimensional integration refers to the review of the results of the collaboration by both communities, so that they can make use of the results in a way that is meaningful to their work (Lang et al., 2012). Professionals will only disseminate results that are useful for their colleagues in that they help to solve or transform a problem, while researchers will only disseminate scientifically relevant and credible knowledge (see section 3.2). In other words, I see a strong logical relationship between the valuation and dissemination components. Since building a mutual, collaborative team as well as developing a shared problem definition and boundary object influence the valuation of the project, they indirectly also influence the dissemination of the results.

Moreover, having concrete aims and a clear process structure has practical project management benefits regarding the evaluation of the project. Regarding the BBF, this mostly touches upon dissemination, since it allows for planning of formal dissemination of the learning outcomes. The BBF explicitly acknowledges the importance of unintended learning outcomes (Mendle, 2013) thus, enhancing this aspect of the Lang et al. (2012) framework.

3.3.5 Reframing

The proper design and implementation of a methodological framework can foster reframing activities in the sense of the BBF (see section 3.1.5), by choosing methods that aim to reframe participants' perspectives and by setting a structure on how to integrate scientific and practical knowledge (Lang et al., 2012). This connects to the previous step of problem framing, which the BBF regards as an important opportunity for reframing exercises (Mendle & Busch, 2014) (see Table 2). Since the definition of a boundary object should be logically derived from the problem definition, setting reflective project aims goes hand in hand with a project framework that aims for reframing. Evaluating the scientific and social impact should therefore not only consider formal and direct learning outcomes, but also try to capture the transformative results of the project. The evaluation of course needs to take the success criteria from the definition of the boundary object into account. Streule (2014) emphasizes the importance of researchers taking a reflective stance as part of their role in the collaboration. She argues that researchers must be the ones guiding to reveal epistemological implications of a certain perspective on an issue. This is reasonable, since it is part of a scientist's everyday work to be familiar with theory. Doing so, they can assume a critical perspective on the methods and outcomes of the project, thus fostering reframing exercises. This can be integrated under the point of assuming appropriate roles and facilitating continuous formative evaluation.

Based on the reviewed literature, I understand transdisciplinarity as an underlying success factor for the BBF in order to accomplish its aim to create effective trans-municipal learning partnerships. Trans-municipal learning itself is seen as a form of social and societal learning. Societal learning is part of the adaptive governance process, in which it acts as the critical voice, asking: "Why should we do what?" Simultaneously, this learning can only take place through actions regarding the sustainability challenge, pathways / strategies and implementation. Societal learning is thus the reflective phase (Mendle, 2013) in adaptive governance. Concluding the theoretical part of this thesis, Figure 6 depicts this integration of the concepts and locates my research in a broader picture.

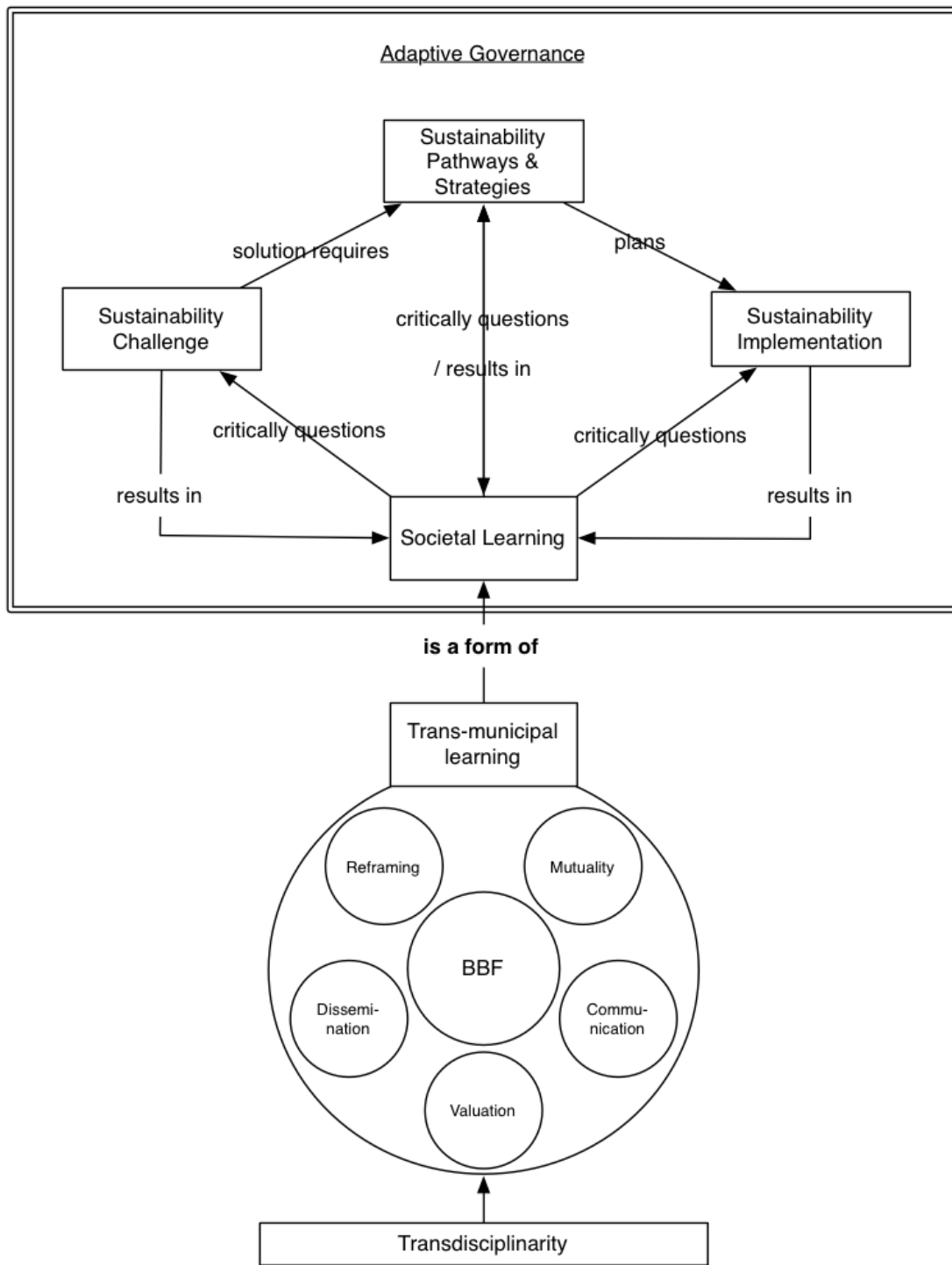


Figure 4. Conceptual Framework

4 Results & Analysis

In this chapter I present my results and analysis from the conducted participant interviews⁷ as well as the project evaluation survey of UTÖ. I begin by applying the BBF on the project. In section 4.2 I apply the Lang et al. (2012) framework. Together, the analysis of the project through both frameworks will serve as a basis for my discussion on how to integrate transdisciplinarity more firmly in the BBF.

4.1 Urban Transition Öresund through the lens of the Ball-Bearing Framework

To answer to what extent UTÖ fulfills the elements of the BBF (research question two), I present my results and analysis of applying the BBF on UTÖ in this section.

4.1.1 Mutuality

“The initiative came from the universities. And then, they think they must have some kind of practical people. Some kinds of things they can study and look at, not just discussing academically at the university. [...] So they approach municipalities to have some kind of people who work with the practical fields that [...] It is not a mutual initiative. It is starting with the universities who want to study this. And then the municipalities come, more or less interested, but it is an option for them. And maybe they can generate some knowledge and they can get something out of that.” (INT_5)

Regarding the appreciation of each other’s input, the response was mixed. While most interviewees described the relationship within the project as very open (23 codings of open relationship versus 7 codings of hierarchical relationship), I found 8 codings of low appreciation of one’s input versus 11 codings of high appreciation of one’s input. Especially researchers noted low appreciation of one’s input in regards to the

implementation of suggestions for more extensive collaborations. Reasons or hurdles why input did sometimes not materialize are presented in sections 4.1.4 and 4.1.5. Likewise, participants had mixed opinions about feeling represented in the outcomes of the project (12 codings of unequal versus 7 codings of equal representation). A reason for this was also seen in the different aims and expectations towards the outputs (see section 4.2.3), as well as backgrounds, resources available and working cultures of the various participant groups (see section 4.1.2). Connected to valuation is the observation that interviewees noted different levels of involvement. In particular, interviewees noted a difference in involvement between researchers and practitioners, with researchers often being able to put more time into the project than practitioners, causing reduced mutuality (see section 4.1.3).

“I know that during the process sometimes, some of the researchers made some decisions in order to find a way forward that meant that some of the practitioners from the municipalities did not feel that their needs were met.” (INT_3)

⁷ The quotes used in this chapter serve as an illustration of key points and relate to the specific BBF element / transdisciplinarity principle they are coded under.

4.1.2 Communication

“Yeah of course, the researchers they need to publish articles. Maybe some municipalities will read it but it is not the tools for people working in municipalities. They want more like a handbook or guideline and so on. [...] So there is a big gap between those two sectors. And if you have project like this you need to have structures that both sectors can be happy about the deliverables.” (INT_2)

In terms of understanding of concepts, terms and working culture, most differences were noted between practitioners and researchers (61% of codings in communicative differences, 67% in working culture differences⁸). Since the INTERREG fund encourages speaking local languages, the language barrier between

Swedish and Danish participants was an issue. However, it only slowed down the process to some extent in the beginning, but did not have any major implications in later phases of the project, due to the development of an own “language” and mutual translation of participants. This was supported by forming mixed activity groups, with both practitioners and researchers in them. The same can be said about interpretations of terms. The establishment of personal relationships and trust between the participants was also seen to foster better communication between participants, even though one interviewee noted that too much friendliness could blunt the critical edge of one’s group. Understanding each other’s background was an important part of this process and helped to close the ostensible differences between the participating municipalities.

Defining what sustainability meant to everyone was another issue throughout the whole process. Some participants emphasized the contextual and procedural meaning of sustainability and stressed the collaborative process of coming to a shared, flexible understanding of the term, even though potential for improvement in this regard was also

“But the meeting there, that's where something happens, because I open my eyes for those, the others' reality, and they for mine. The mix there, there we can build something called sustainability.” (INT_7)

noted. Since these processes took time, participants often referred to a “time factor” (11 codings) as helping to solve communication problems. Facilitation of discussions was mostly done through activity leaders, who ranged from project management, to practitioners and researchers.

⁸ Compared to differences between Danes and Swedes.

4.1.3 Valuation

Formal recognition of participation, in the sense of certificates of participation, etc., was not given in UTÖ. Even though appreciation of one's input (see section 4.1.1) was mixed, participants mostly felt acknowledged by the other participants in the project. The interviewees generally could allocate time and resources to the project, which was an

"I think that for the academics, it is their basic work. For us it is [...] something, which we do in addition to our normal work. [...] And therefore, you can say the results are not so crucial for us. Or the output is not so important because it is only 10% or 5% of what we are doing." (INT_5)

acknowledgement by their respective employers. However, the amount of hours they could allocate to the project seemed to vary from employer to employer. This connects to the financing scheme of UTÖ, which was seen as a double-edged sword. On the one hand, since 50% of the costs were covered by the organizations involved in the project, this meant that they had to have genuine interest in the project and not only see a financial advantage. However, depending on how it was structured, this also meant that organizations that wanted to execute a certain project anyway, would simply get 50% paid by the EU if they could argue for its relevance to UTÖ.

"Well, I feel sorry for them [researchers] as well, because many were frustrated with them and they never delivered. But I do understand them. Now. More." (INT_6)

Apart from varying degrees of formal recognition by the employer, some interviewees felt acknowledged by their colleagues and superiors, due to an interest in (the outcomes of) the project. However, the varying applicability of the results prevented some participants to share the information in their organization (see section 4.1.4). The participants themselves were mainly motivated by being able to share their own experience, paired with curiosity to see methods of urban planning in other cities in the Öresund region, thus broadening their horizon. Additionally, for the researchers immersing in practical urban planning work was important, while practitioners mentioned networking as being an important motivation, too. Some researchers felt that the academic structure did not allow their university to value them as much as they could have in terms of resources, due to the necessity to produce publishable results. In retrospective, most participants were quite satisfied with what they took out of the project, with a mean satisfaction of 2.8 (1 = not satisfied, 4 = fully satisfied).

4.1.4 Dissemination

When asked about the usage of the outcomes of UTÖ, there was a tendency in most interviewees' answers towards not using the formal outcomes of the project too much (in 5 of 6 cases), but rather the informal ones, such as building a network, gaining motivation,

"I think the problem is, it feels a little bit like: Okay, now I helped this one guy. That is really lovely. And I used two or three years for it. Of course it is still a question of how can we make that kind of process more effective?" (INT_8)

inspiration, awareness, self-actualization (Maslow, 1943), as well as fostering reflection on one's work and urban planning and sustainability (see section 4.1.5). In the same way that they stressed the importance of informal learning outcomes, the verbal dissemination in the form of discussions and casual talks during events and site visits were seen as good ways to spread knowledge within the project. More formal dissemination through presentations and papers did also take place (often as part of the project outcomes) but was by most participants not seen as fruitful as the informal communication that inspired reflection.

Opinions varied in terms of what participants took out of the project. While it was mentioned that everybody had the same possibilities to obtain information generated within the project, differences in what was learnt depended on the background, interest and dedication of the participant.

"The bad thing with universities is that they are so focused on writing articles in academic magazines, which are peer-reviewed, and which no one else than other academics read. [...] So their circulation is so limited. [...] A lot of research is wasted because no one reads this, only the one who visits a conference every second year. It is a very closed world, which does not contribute. And this is the problem, I think, with critical university things. That they do not have an impact anymore. It does not reach the society anymore." (INT_5)

Some interviewees criticized that despite the inspiration they took out of the project, they would have wished for some more tangible outcomes (see section 4.2.6). This perceived lack of tangible outcomes was seen to prevent the dissemination outside of the project to some extent, which goes hand in hand with the observation that dissemination outside of the project was following more formal ways, through

the organization's website, internal newsletters, intranet announcements, and presentations, but was sometimes accompanied or followed up by more informal lunch or coffee break talks. To the researchers it was important to better understand how to work with practitioners and thus also provide better guidance for students who would like to work in a transdisciplinary setting. Another way of distributing the information to outsiders was by inviting them to the Urban Transition Forums. Representatives of 82 external organizations from both countries visited the six Urban Transition Forums (PART_FORUM1-6_UTÖ).

Some participants found it hard to disseminate the knowledge through wider circles than their direct contacts, meaning that the dissemination in their organizations was limited. The impact of the formal outcomes from the researchers' side, in the form of scientific papers, was highly doubted by both researchers and practitioners (see section 4.2.3). Moreover, some

And as you say power relations, they [urban planners] are also influenced by the politicians for example. And I did not address the politicians in the project. I think that is one of the lessons from this project, is that we need to involve the politicians. Because they are really, really important. Because they are actually the ones setting the agenda for the planners. I can really sense a big frustration there, but I was just not able to do anything about it. (INT_8)

participants mentioned resources as a problem to effectively disseminate the knowledge both within and outside of the project (see section 4.2.3). The biggest barrier (22 codings) to spreading knowledge however, was the organizational structure or bureaucracy and a lacking mandate to implement the knowledge that was gained (see sections 4.1.5 and 4.2.1). This is also connected to a lack of outspoken political support and the fact that municipalities operate within a very defined legal framework.

4.1.5 Reframing

"So it was just a learning process for me I think, these three years: Oh you work with that, okay. Oh you participate in that project, alright. And the politicians demands this, alright. So it has been a learning process and I think that the project has given me knowledge what I can work with now and try to maybe not understand the root cause [of sustainability problems], but work with it where it is needed and will give most effect." (INT_6)

The findings suggest that single, double, and triple-loop learning took place equally (7 codings each). This seems logical, since higher-loop learning is usually activated through lower-loop learning (Pahl-Wostl, 2009). Participants both reflected on sustainability in urban planning as well as their role in these planning processes.

Reframing also took place in terms of gaining an improved understanding of different working cultures (Swedish/Danish, Researchers/Practitioners, etc.). However, one participant criticized that the discourse was mainly driven by catastrophes and political capitalization on those, such as the 2011 Copenhagen cloudburst, rather than a grand vision.

While interviewees see reflection to have taken place among project participants, the impact outside of the project was doubted, due to aforementioned scale, administrative, and political barriers (see section 4.1.4). This raises the question in how far the reframing exercises in UTÖ can be considered triple-loop learning, because triple-loop learning refers "to a transformation of the structural context and factors that determine the frame of reference. This kind of societal learning refers to transitions of the whole regime" (Pahl-Wostl, 2009, p.359). Clearly, UTÖ has not transformed the Öresund region's mode of governance or the discourse in the population in the Öresund region at large.

This was also noted by an interviewee, who mentioned that for a “real” urban transition to take place, people would have to change their values and lifestyles. However, the very existence of UTÖ is an indication of a beginning paradigm shift away from established governance system towards one based on “learning networks challenging dominating structural assumptions” (Pahl-Wostl, 2009, p.360).

“So rather than thinking of the product as a final outcome or you know, some kind of presentation of something, I think the product became more of an analytical mapping. That we together tried to deconstruct what is going on in this kind of planning process. Who are they talking to, why are they not doing anything about sustainability? [...] And then we can say that the final product of course, still had some recommendations, but those recommendations are actually maybe kind of illustrating the results of the mapping, or the deconstruction.” (INT_8)

Methods for reflection included workshops specifically aimed to give space for reflection, discussions, as well as change of contexts of participants, by for example changing office to another organization for a limited time. One activity (board game development) was seen as especially well-suited to foster reflection among the participants, because it was a very tangible product that at the same time required the developers to ask themselves what is really important in sustainable urban planning and why. This is also reflected in some interviewees’ opinions that the results of a project need to inspire reflection, too, not only the discussions and informal communication during the course of the project, in order to achieve wider reflection (4 codings). This means that the dissemination of knowledge has to be geared towards its purpose of changing the perspectives of the recipients, suggesting personal, informal channels of communication (see section 4.1.4).

„I guess, again it depends on what kind of research you are working on. If you are working within natural, technical science, then of course your input to the process would be totally different than if you work with a kind of governance, design, action research perspective. So of course, some had delivered more data into the process, whereas I think the strength of having a kind of action research, urban planning perspective, is more like you try to give some directions and to point to some moments in the planning process and then the municipalities have to choose their own direction and get inspired. So it is two different angles of working with it.“ (INT_3)

Apart from upscaling problems (see 4.1.4), the question of whether the knowledge was picked up on depended on how open a participant was to alternative standpoints (14 codings). Other barriers to reflection outside of the project were a lack of resources and time (13 codings), as well as missing political support (see section 4.1.4) or conflicting agendas (9 codings).

While researchers were seen as important to foster reflection by most participants (18 codings), with some noting that this is and should be their primary role in such a project (see section 4.2.4), the results are mixed to what extent they could fulfill this role. It was also mentioned that some researchers inspired more reflection than others, which was ascribed to different research paradigms

and approaches. Researchers with a more critical perspective were seen as being more suited to initiate reframing activities.

4.2 Beyond the Ball-Bearing Framework: Urban Transition Öresund as a trans-disciplinary research project

I analyze UTÖ through the Lang et al. framework on transdisciplinarity (2012) (see section 3.2) in order to understand UTÖ's transdisciplinary elements and build a foundation for answering my fourth research question. The sections are structured according to the 12 design principles⁹ of the framework.

4.2.1 Teambuilding

The choice of participants in UTÖ was open to the participating organizations. This may on the one hand have the advantage that the participating organizations know the skills and available resources best, but has the disadvantage that there is no centralized control over the skillset present in the project. A skill that was seen as particularly important is the ability to understand researchers respectively practitioners and being able to express oneself in a way that the other group could understand one. One interviewee also mentioned that the project setup was new to many participants, resulting in less than optimal knowledge dissemination.

“Several people shifted during the process, so we had to [...], renegotiate, [...] establish what is most important to work with now.” (INT_3)

“Because if they [urban planners] as the sole actors decided on those things, they were not sure whether it would actually be supported politically and supported by the leadership. And then comes the question: Did we have the right strategic actors?” (INT_3)

Despite a lack of central control, different educational backgrounds were represented in the project. There was of course a focus on urban planning / geography (10 participants), followed by environmental and sustainability studies (4 participants), social / political science (3 participants), engineering (2 participants), architecture (2 participants) and one participant each with a communications, economics, design or decision analysis background. A balance between practitioners and researchers was more or less established, with 44% researchers and 56% practitioners taking part in the project¹⁰.

Another aspect that had negative implications for the building of a collaborative research team was the fact that participants, activity leaders and project coordinators changed throughout the course of

⁹ I merged the sections on problem definition & boundary object formulation, as well as the sections on design and application of the methodological framework.

¹⁰ Based on survey.

the project. This resulted in re-orientations that could sometimes also be helpful for reaching the final outcome, but were not time-efficient.

As mentioned in sections 4.1.4 and 4.1.5, another reflection was that the participants' mandate and position in the organization was something to consider for future projects, because it often posed a barrier to effectively implementing the findings of UTÖ. Action-oriented, transdisciplinary research processes should therefore see the mandate to implement changes as a skill or unique contribution that is to be considered in the building of the team.

4.2.2 Problem definition & boundary concept formulation

The following aims were set in the project application (APPL_UTÖ, own translation):

1. Establish shared, regional guidelines for sustainable construction to strengthen the inter-regional approach to sustainable urban development.
2. Develop processes to stimulate sustainability and quality in construction by developing methods for collaboration- and implementation models (Co-labs and Do-tanks).
3. Establish new financing models that advance sustainable construction by emphasizing, among others, savings in costs for energy and operation.
4. Develop new planning tools that include a broad definition of sustainable urban development throughout the entire planning process.
5. Produce models, taking the whole project process into account, in order to secure knowledge sharing between the individual project elements and to act as a catalyst for sustainable urban development.

Interviewees unanimously agreed that the initial application and the aims formulated in it were very open. This was the one hand seen as positive to allow for a freer, explorative learning, but caused problems in achieving concrete goals. Changing project and activity group leaders also caused some confusion in regards to the project structure (see 4.2.1).

"The application [...] is really open. It is a lot of: We want to do this, and this, and this, without saying that much on how to do it and which focus we should have." (INT_2)

While the outcomes were to some extent defined in the project application, participants still felt that they could interpret and change them to some extent, allowing for a more collaborative problem definition and aims (14 codings of collaborative versus 5 codings of predefined problem definition). This again took time and caused frustration among those participants who had a different interpretation of the application's aims, but it also increased the relevance of the outputs for other participants.

“It would probably have been easier if we had some more focused group and some more focused problem definition. Yeah, that is for certain.” (INT_3)

Related to the aspect of teambuilding, opinions were mixed regarding how differences between municipalities influenced the project. Some interviewees mentioned that the differences especially in terms of size and resources were a major obstacle in finding shared aims, while others mentioned that over time participants noticed that even though their municipalities were set in different contexts, they would find that their work is not so different. The cross-border aspect of the project was regarded as especially positive in this sense, because municipalities could find partners that had similar challenges or were set in a similar context, outside of national restrictions. However, different legal and political frameworks in both countries proved a difficulty in creating outputs that could be applied in both countries. This aspect is also related to teambuilding on an organizational (not individual) level.

4.2.3 Framework & application of methods for collaborative knowledge production

Most interviewees agreed (14 versus 3 codings of non-existing / existing framework) that there was no clear framework on how the knowledge would be generated, and research methods on how to achieve the goals were developed on the way. This finding comes despite the fact that there was a ca. one-hour workshop in the beginning, in which the researchers introduced themselves and their methodologies and common, overarching success criteria were collaboratively defined. Depending on the activity group, the group would then discuss and decide in which direction the researchers should direct their attention.

“But in the main project, the collaboration between the minor working groups was very confusing and not that clear.[...] I mean the results are in the minor working groups and that is where it should be [...]. But I think in the beginning it was very unclear of how the major project will proceed, or how the process will be these three years, and when and what we in the minor working groups, how we will collaborate with others or when will we present some results. Halftime or /? It was very unclear that way.” (INT_6)

Some researchers were very aware of the necessity to adapt their research for a transdisciplinary setting and also did so, by taking on a more active role, than having a purely consultative function (see section 4.2.4) and targeting their results towards practitioners (see section 4.2.6). However, there was no unified framework how this would be achieved. This also caused credibility problems: Some researchers experienced difficulties in reintegrating their research in the scientific body of knowledge in the form of peer-reviewed publications. Due to the lack of a clear framework, it was up to the individual researcher to involve practitioners in their research, resulting in very different working cultures in the individual activity groups.

It was also up to the participants how the knowledge would be reintegrated in their respective profession or discipline. The applicability for practitioners of the scientists' research was not always ensured. Moreover, the observation that interviewees referred to strong methodological differences between the various researchers, hints that the integration of the various academic disciplines present in the project was not always achieved. Some participants said that they simply did not know what the researchers were doing, but also admitted that they did not specifically ask for it. This confusion is also reflected in the lower importance practitioners place on the input of researchers to their learning experience (arithmetic mean within practitioners/researchers: 3.21/3.64 on a scale from 1 (very low) to 4 (very high)). One participant also mentioned that there is a natural difference between academia and practice, and that both worlds have their specific expertise and roles that cannot be completely exchanged, which corresponds with Scholz' (2011) understanding of transdisciplinarity, that both types of knowledge (experiential / scientific) are fundamentally different epistemics and therefore have different functions in the solution of real-world problems.

4.2.4 Roles of practitioners & researchers

Interestingly, some practitioners expected the researchers to have a consulting role, providing informative knowledge about a particular issue. This easily goes together with a more traditional understanding of applied science or professional consultancy (Funtowicz & Ravetz, 1993). However, some researchers aimed to work in a transdisciplinary way. These conflicting expectations caused some misunderstandings and frustration

"Because as an academic, you realize expectations are that you come as an expert and you know exactly what to do." (INT_3)

"And I think to me that is one of the roles of the academics. That you have this kind of critical, reflective perspective. I do not see myself as somebody who should talk, and just talk and say the same thing. So just uncritically solve the problems that the practitioners come with. I think sometimes I have this very critical perspective, that sometimes the practitioners are made aware of what their real problems are." (INT_8)

with the outcomes. However, many practitioners also saw the unique contribution of researchers in the critical reflection they could evoke. This misunderstanding can also be related back to the openly phrased project aims, which are vague about if the project aspires to transform urban planning practice in the Öresund region, or simply wants to generate models and tools that enable

this. Due to the project being coordinated by a university and the project work being more central to the research than to the practitioner's daily work, some interviewees also saw the researchers as the drivers of the project.

Practitioners largely regarded their role as that of the expert for their project case or city, and as the user of the knowledge provided by the researchers. But they were also seen as providing the

“And the practitioners on the other hand, they can challenge your ideas about the world and how it works. And I also got a very big insight into the different organizational structures and practices in the municipalities. Which I realized is extremely defining on how they work.” (INT_3)

researchers with insight into the practical planning work and thus allowed the researchers to understand how organizational structures influence their work.

In general, practitioners seemed to have had a clearer understanding of their role than researchers, with the

researchers having to settle in and find their role in the project, which can partly be attributed to the nature of the research process, paired with the necessity to get to know the practical cases first.

Since the project was aimed at municipal employees, the general public was largely uninvolved. However, some project groups had interactions with residents, for example when trying out tools such the board game. Some of the researchers also involved residents in their research that would then feed into the outcomes of the working group.

4.2.5 Two-dimensional integration

Because of the many different actors involved in UTÖ, the project structure can be seen as beneficial to the aim of scaling up and generalizing the knowledge produced, as the plurality of needs and perspectives within the

“One of the things I addressed very much in Urban Transition, was that, some of the municipalities, especially when you look at the detailed planning, are very focused on regulating. I mean, that is what they are used to do. So a big part of their planning practice and their comfort zone is when they want to integrate something with sustainability, they want to put it in the detailed plan, as kind of a law requirement.” (INT_8)

project prohibited narrow, case-specific results. However, the project was clear on the context it operated within, namely that of the Öresund region and thereby the Swedish and Danish frameworks. Thus, it acknowledged the limits to the generalizability of the results.

As mentioned in section 4.1.4, the formal outcomes of UTÖ are not utilized as much as the informal outcomes and the complexity of transitioning cities (or a whole region) towards a sustainable mode of operation is a convoluted task. Thus, it cannot be said that the project achieved an urban

“I never got involved to design their [researchers] method or their thesis. But I think, at least with some of the researchers, we had a dialogue. But mostly I felt, well I was sharing my knowledge and late in the project got something back.” (INT_6)

transition as the project’s name states, but it is a stepping-stone in transforming the region’s cities. Nevertheless, some activity groups were focusing more on producing integrated products than others (see Appendix II). Moreover, one researcher fully

crossed the science-society gap and tried to become part of the knowledge reintegration process on the practical side, by influencing how the produced knowledge was used in the municipalities.

“In Sweden, they often use the universities as partners when they want to make evaluations and have something to look at their practice. And this is much better because normally it is more critical. The private consultants, they /. The feedback they come with is what they are paid for. So they are not neutral and they are influenced by the hand that feeds them. So it is much better to work with universities. The bad thing with universities is that they are so focused on writing articles in academic magazines, which are peer-reviewed, and which no one else than other academics read.” (INT_5)

Some practitioners bemoaned that there was a time gap between when the practitioners needed the results from researchers, and when they could provide them. This is supported by the notion that some scientific papers based on UTÖ are still not yet published, making proper two-dimensional integration difficult.

As mentioned above, the lack of a clear methodological framework posed a challenge to those researchers, who adapted their methods for a transdisciplinary setting. One researcher mentioned that an action research approach causes problems in terms of authority, doubting the methodological credibility of such an approach.

It is comparatively easy to judge in how far the formal results have been re-integrated in their original body of knowledge. The informal outcomes on the other hand are much more difficult to evaluate, because they are immaterial, vary from person to person and cannot undergo a review process. They can be discussed, but they cannot be interpreted on a common basis like a report that is only perceived in different ways.

4.2.6 Targeted products

The project very much acknowledged the need to produce different kinds of products for practitioners and researchers. Some very practical products that were targeted to the practitioners’ needs were e.g. a board game for collaborative planning, concrete guidelines or development of new financing models, etc. (see Appendix II).

“If you do not make that link between the practice and your academic tool, then how are they ever going to even discover that you have this tool or use it?” (INT_8)

Some researchers in the project specifically adjusted their research to what the municipalities needed in order to foster the utilization of their results by practitioners, by e.g. integrating their

“But I must say, since this was a difficult project and the outcome came very late and was not exactly what we expected, I have not been really talking so much about it in my organization. There was not really anything to tell except that: Okay, we are still talking.” (INT_4)

findings in planning tools that municipalities already use, such as Geographical Information Systems. This was again dependent on the research paradigm of the researcher and caused aforementioned difficulties (see section 4.2.5).

4.2.7 Evaluation of societal and scientific impact

A general evaluation of the societal and scientific impact of the outcomes of the project was not conducted within the project. However, through the network-building function of the project, individual participants kept in touch and continued their partnership, thus being able to see the usage of specific outcomes after the project.

The degree in how far the formal outcomes are applied in the municipalities varies (see sections 4.1.4 and 4.1.5). While the informal outcomes have influenced the mindset of some of the practitioners, this does not mean that they can apply their knowledge, due to aforementioned barriers.

Judging from my literature search, the scientific impact seems to be relatively small so far. Two papers were published in scientific journals and several documents that can be classified as grey literature were published. The publications are not widely cited (see Appendix II). However, some papers based on research from within UTÖ are not yet published, so the scientific impact is likely to increase. As Lang et al. (2012) mention, it is a common problem to reliably assess the scientific impact of transdisciplinary research due to its different research approach and epistemology. This is reflected in the fact that UTÖ has mostly produced grey literature (see Appendix II).

4.2.8 Continuous formative evaluation

There was no formal formative evaluation¹¹ throughout the project, but work in the activity groups usually took place on a quite mutual relationship (see section 4.1.1), meaning that participants and project leaders were open to feedback, thus encouraging it.

4.2.9 Conflict mitigation

As mentioned earlier, there have been some conflicts of interest that could not always be resolved. Interviewees mentioned that sometimes the activity group leaders took a decision in order to bring the project forward. Thus, sometimes conflicts were accepted as necessary, which can of course affect the mutuality of the project negatively.

¹¹ In this thesis I refer to the widely cited definition by Black & William (1998), defining formative evaluation as: “encompassing all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged” (p.7).

4.2.10 Capabilities & interest in participation

Since the project was voluntary, all interviewees expressed personal interest in the topic as a motivation to participate. However, they also mentioned that some participants partook very irregularly in working group activities. This was mainly ascribed to material obstacles in the form of allocable resources that enabled or diminished the capabilities of participation of some actors. Apart from this, due to conflicts of interest about the direction of the activities that could not be resolved, some participants lost interest in the project and left it. Within the working groups, the working group leaders were responsible for moderation and facilitation between group members. In larger fora, designated hosts were responsible for moderation.

The last section of this chapter analyzes the coded segments quantitatively and establishes a focus for my discussion of the findings (chapter 5).

4.3 Overlap of themes

After having examined UTÖ from both perspectives, it is interesting to look at the quantitative connections between the two concepts. To find the strongest intersection between transdisciplinarity and the five elements of the BBF, I retrieved the set overlap of codings of each element of the BBF with codings of transdisciplinarity. In total, 62.2% (630 of 1013 total codings) of the codings overlap, suggesting a considerable relation between transdisciplinarity and the BBF. As can be seen in Table 3, the reframing, valuation and mutuality elements show the greatest, and almost equal, relative overlap with transdisciplinarity, which corresponds with my theoretical analysis, in which I found most commonalities in these elements (see section 3.3). Therefore, I will focus on the relationship between these BBF elements and transdisciplinarity in the next chapter and discuss how to develop the BBF further.

Table 3. Overlap of coded segments of transdisciplinarity with coded segments of elements of the BBF. Total codings refers to the amount of coded segments of each element of the BBF. Overlapped codings refers to segments, which are both coded with BBF and the Lang et al. (2012) framework. To level out differences in the frequency of coding of the five BBF elements, the amount of coded segments of each BBF element is leveled to the most often coded element (Dissemination). Factors & relative overlap rounded to the second decimal, factored overlapped codings with transdisciplinarity rounded to 0 decimals.

	Reframing	Dissemination	Valuation	Communication	Mutuality	Sum
Total codings	138	148	105	130	109	630
Overlapped codings with transdisciplinarity	63	34	44	31	46	218
Factor	1.07	1.00	1.41	1.14	1.36	-
Factored overlapped codings with transdisciplinarity	67	34	62	35	63	261
Relative overlap (factored codings)	25.67%	13.03%	23.75%	13.41%	24.14%	100%

5 Discussion: Towards an enhanced Ball-Bearing Framework

Bearing the theory as well as the findings from the two previous chapters in mind, I discuss their implications for the further development of the Ball-Bearing Framework in this chapter (sections 5.1 – 5.3). Together with my recommendations for future research (section 5.4), this chapter answers research question four.

5.1 Mutuality

The empirical integration of the frameworks points to several factors, not considered in section 3.3. The analyzed interviews show that it is important to consider who takes the initiative for a project. Even though UTÖ was created by a steering group of all 10 participating organizations, some participants still perceived it as a university-led project, which influenced the attitude that some practitioners had towards the project (see section 4.2.4). This also relates to the resources available and centrality of the project to one's job: It was mentioned that researchers often had more time to allocate to the project than practitioners, resulting in this imbalance. Thus, it is important to consider teambuilding and capabilities of participation when looking at mutuality. But it is also related to the (self-)understanding of the role of municipalities. Both sides need to see the municipalities as more than the empirical case used for research. In order for socially robust knowledge generation to take place, the practical relevance of the knowledge needs to be ensured through the practitioners, while researchers need to ensure scientific credibility (Cash et al., 2003). This varied between the activity groups, with some focusing more on the co-production, and thus good saliency of knowledge. Other groups following a more traditional science advice approach focused on high scientific credibility. The choice between these depended on the research paradigm of the involved researcher. A better interdisciplinary integration between the scientists would increase the coherence between the researchers and thus clarify their role.

Researchers were seen as highly important to inspire reflection on urban planning. However this role also led to the necessity of researchers taking decisions that were opposed to the expectations of practitioners, since critical reflection requires taking on a different perspective (Wilson & Johnson, 2007). While this does not necessarily indicate a hierarchical relationship between the partners, it is helpful to clarify the critical ambition of researchers in advance and state it in the project aims, which in turn suggests a collaborative problem and boundary object definition.

One of the outcomes, and at the same time a hurdle in the beginning of UTÖ, was the establishment of trustful, personal relationships. These are seen as essential in transdisciplinarity theory (Stock &

Burton, 2011), and support the Habermasian notion of speaking veraciously¹² in an ideal speech situation (Habermas, 2011 [1981]).

The BBF can accommodate abovementioned notions, since it speaks in quite general terms about a “two-way relationship characterized by openness” (Mendle & Busch, 2014, p.3). Practically however, it is important to specify more concretely the underlying drivers and hurdles to establish a mutual relationship. My findings indicate that having a clearly laid out boundary object and methodological framework that assigns clear roles and consequently generates correct expectations of the contribution of each group is highly important (see Figure 7 and section 5.2). Such a mutual partnership also contributes to mitigating conflicts from the beginning.

5.2 Valuation

With regards to valuation, the theoretical integration of the elements (see section 3.3) was largely confirmed by my findings. There is a strong, logical dependency in terms of valuation between a collaborative problem framing, boundary object formulation, methodological framework, appropriate roles, and re-integration into the specific bodies of knowledge (see Figure 7). A collaborative problem framing enables a shared definition of a boundary object. As seen in UTÖ, if the aims are too wide and allow for interpretation, it is difficult to narrow them down without losing the interest of some participants, since opposed agendas are likely in large groups. The absence of a methodological framework in the case of UTÖ (or an ill-defined one) was a major obstruction to the valuation of the research process and reduced the internal valuation (see section 3.1.3)

On the one hand it caused unclear expectations towards the roles of researchers in the project, reducing the valuation of the researchers by the practitioners (see section 4.2.3). In the interviews researchers were always positive about what they learnt from practitioners, while practitioners mentioned difficulties in learning from researchers. Better clarity of the role of researchers may have improved the learning experience of the practitioners or at least decreased the practitioners’ expectancy dissonance, thus increasing their valuation of the researchers. Moreover, appropriate roles also ensure continued interest in participation.

On the other hand it caused problems for researchers to reintegrate their findings into the scientific body of knowledge, i.e. generating credible knowledge (Cash et al., 2003). The valuation of the project and its results by the scientific community can be made visible through an impact assessment. Formative assessments can be used to manage the valuation of the project by participants and react early to avoid a loss of interest through ensuring a good learning experience.

¹² German: wahrhaftig

Connected to mutuality is the observation that it is highly important to collaboratively choose methods and aims, as it otherwise leads to low valuation of the project by the participant and can even cause the participant to drop out (see Figure 7 and section 4.1.1).

As mentioned in section 4.2.6, targeted products are important for the valuation of the project by colleagues and superiors. It is essential for the external communication of the project to be able to have concrete and applicable results for the respective organizations. If an outcome is not relevant to the employer of the participant, there is no occasion or cause for the participant to spread the information in her organization leading to decreased valuation of the knowledge gained in the partnership. Valuation by the employer is at the same time important to ensure continued capabilities (i.e. resources) for participation. If an organization does not see the benefit of a project, it might withdraw its resources. Valuation is thus achieved by generating socially robust knowledge (see section 3.2) that requires a mutual process and can be made visible by conducting a societal / scientific impact assessment.

5.3 Reframing

The strong overlap between transdisciplinarity and the reframing element of the BBF was confirmed by my interviews. Reframing can be seen as a crosscutting element that takes place throughout the whole process if properly facilitated (see Figure 7). It is not a clear result that comes as a reward at the end of a long march towards it, because there is a logical dependency between the framing of a sustainability problem and the aims of the project and its outcomes. If a problem is defined in an uncritical way, reframing cannot take place, since it is essentially about seeing things from a different perspective. Thus, if reframing takes place depends to a large extent on the project's aim and design. This also means that reframing may be perceived to stand in opposition to the aim of producing salient knowledge (Cash et al., 2003), since reframing outcomes might not be directly helpful in solving a concrete practical problem. A focus on reframing, which goes hand in hand with more novel research approaches, such as Action Research (Stokols, 2006), also makes it difficult for researchers to uphold their scientific credibility at the same time (see section 4.2.5). Formative evaluations are one possibility to inspire reflection. In some working groups in UTÖ, the constant contact between researchers and practitioners groups allowed for continuous reflection at all time, not just at specific reflexive milestones.

As I have shown, researchers are important to foster reframing activities among the practitioners. By leaving their traditional domain, they can reflect on their own research activities, thus fostering a paradigm shift (Kuhn, 2012 [1962]) towards post-normal science (Funtowicz & Ravetz, 1993). But for researchers to be able to fulfill this role, they need to be given the necessary capabilities for

participation. A researcher in UTÖ noted that she had many different tasks within and outside of the project, making it difficult to fulfill her role. Thus, the participants themselves and project management need to find a consensus in how far they take over leadership roles (which may also be helpful to foster reflection) and keep administrative tasks away from participants as much as possible, so they can focus on their actual work. In terms of teambuilding it is important to select researchers who operate with a transformational agenda. Moreover, in order to have a practical effect, teambuilding becomes even more important. Authority to implement changes is a “skill” without which the learning is bound to stay on a theoretical level or small-scale, and thus not fulfilling the transformative agenda of sustainability science (Miller et al., 2013). Thus, reframing cannot meaningfully be separated from dissemination. While dissemination can take place without reframing, triple-loop learning takes place on a landscape level by definition (Pahl-Wostl, 2009) and can therefore not occur without spreading the knowledge outside of the cooperation. This means that reframing takes place both within the project among its participants and through dissemination outside of it, by contributing towards a societal transition towards sustainability.

I agree with Ison et al. (2013), that it is most important preserve the “capacity to recreate performances of social learning in new contexts” (p.40). The BBF acknowledges this too (Mendle, 2013) and outcomes in UTÖ, such as the creation or extension of network, support this capacity. This supports the point that informal or unintended outcomes (such as reframing) are often most important in municipal learning partnerships (Mendle, 2013).

Figure 7 shows my integration of transdisciplinarity in the BBF based on both theory and empirical findings. While mutuality appears to be an underlying factor, this does not mean it is the most important one. Mutuality is beneficial to create valuation and indirectly reframing, but Mendle & Busch (2014) note that both elements are also influenced by the other two elements and they include notions of transdisciplinarity that are not located within the mutuality element (e.g. formative evaluation).

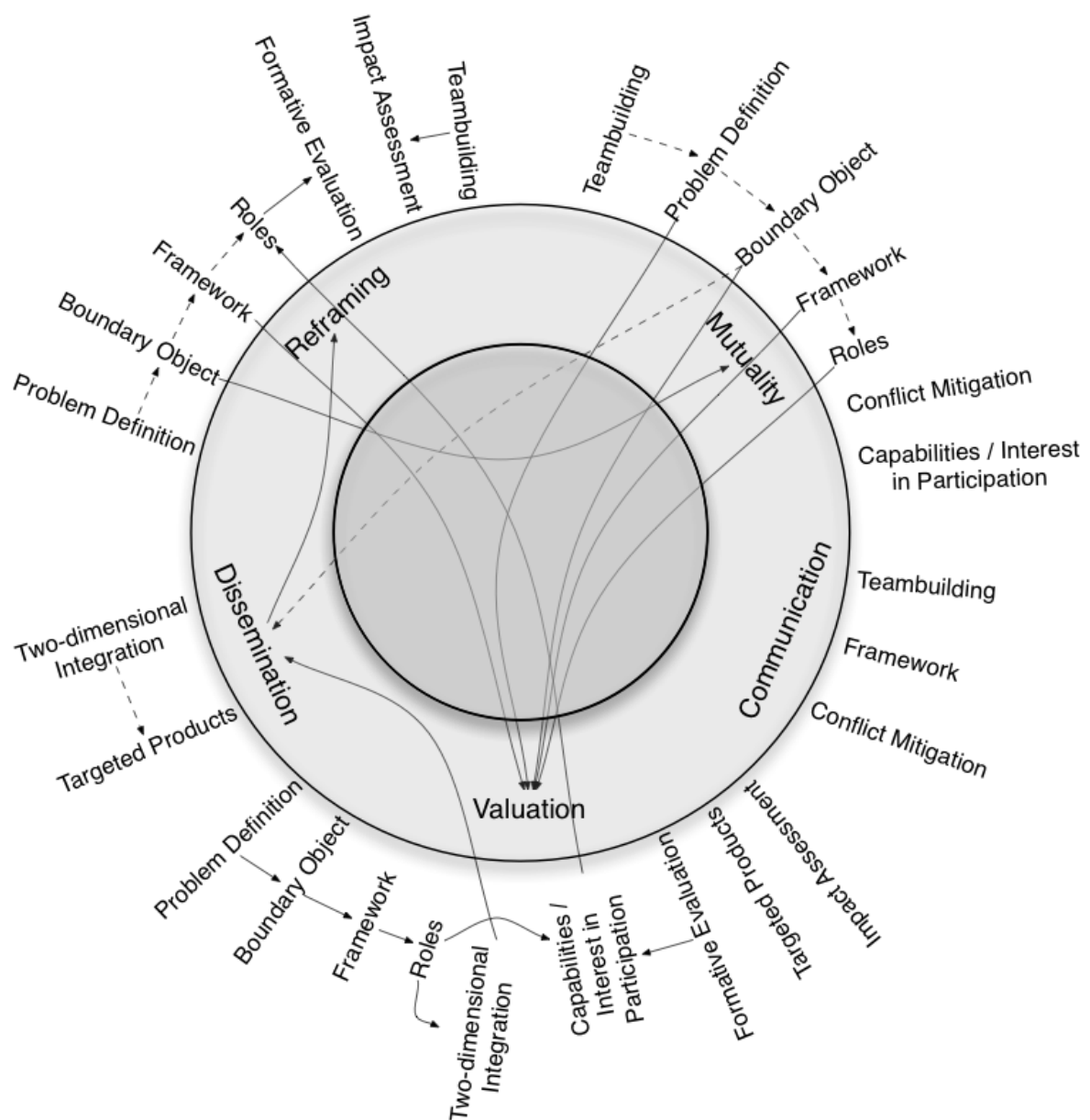


Figure 7. Integration of the BBF and the transdisciplinarity principles of Lang et al. (2012). Dashed lines indicate a theoretically shown connection; full lines indicate an empirically confirmed connection. All transdisciplinarity principles link to their respective parent BBF element.

As Collier (1994) writes, critical realists try to reveal the generative mechanisms of things. In my case, this is the quest to understand how, and if so why, transdisciplinary partnerships can support inter-municipal learning for sustainability. As my discussion has shown, transdisciplinarity can play a central role in improving inter-municipal learning. There are dependencies and connections within and between elements of the BBF that can be analyzed with transdisciplinarity as a lens that I have shown in this chapter. A well-managed transdisciplinary component in municipal partnerships can be seen as the oil in the ball bearing. It will take the municipalities further in their learning experience. More importantly, it gives direction to the municipalities' learning by fostering reframing.

The friction between practice and academia gives rise to critical reflection on both sides and on both the topic of the partnership as well as the participant's personal roles. The problems caused by the lack of a methodological framework in UTÖ underscore the already theoretically established importance of this principle.

While I am confident that connections presented in this chapter are central generative mechanisms in trans-municipal learning, I do not assume that they stand alone, since there is a plethora of generative mechanisms in open systems that together form the actual world (Collier, 1994).

5.4 Recommendations for future research

Evaluating the two frameworks, I found both valuable in analyzing the partnership. During the open coding process, I did not find any additional codes that did not fit into the frame of the five elements of the BBF or transdisciplinarity. When the participants were asked at the end of the interview if they had anything to add, they either did not, or added points that could be integrated in the codes derived from the BBF or Lang et al. (2012) framework. This indicates that the BBF seems to provide a good framing of inter-municipal learning process for sustainability, and the Lang et al. (2012) framework is a good lens to examine the transdisciplinary aspects of an inter-municipal learning partnership. However, this does not mean that the BBF cannot be improved. An important notion that came up during my study is that more research is needed to test and understand the connections between the individual elements. Modeling these connections could be highly beneficial to increase the practical applicability of the BBF. A mixed methods, cross-sectional approach with a strong quantitative component would be highly appropriate for such a study to ensure internal and external validity (Bryman, 2012).

Apart from this, there might be project constellations in which other factors come into play that need to be considered. In UTÖ, this was mainly the aspect of transdisciplinarity; in other partnerships it might be citizen involvement, politics, culture, etc. A more open research aim that intends to widen the spectrum of possible relations between the BBF and concepts that influence societal, social or individual learning, or towards other theories in sustainability science (e.g. transition theory) would also be beneficial additions to research on the BBF. Depending on the focus of future studies, it may make sense to include more researchers in the sample to provide a counterbalance to my study.

I focused my discussion on the mutuality, valuation and reframing elements due to the stronger overlap of my findings in these elements. However, since all elements are connected with each other, a future study may find it useful to scrutinize the communication and dissemination elements

in reference to transdisciplinarity and examine why there seems to be a lower overlap with these elements.

It can be difficult to evaluate what kind of learning took place (single, double or triple loop) when it comes to how somebody does her job. For example, a reflection on what method to use in a workshop (i.e. *how* to do one's job) is often based on deeper frames of reference such as goals, norms and values (Pahl-Wostl, 2009). My method was not aimed at exposing these, because I aimed at uncovering the connections between the BBF and transdisciplinarity. A study that focuses on the reframing element with a clear focus on triple-loop learning would certainly benefit the further development of the framework and could apply discourse analysis, to analyze how the deeper frames of reference were influenced by the partnership.

6 Conclusion

This thesis looked at the co-creation of knowledge for sustainable urban planning, and specifically the relevance and role of researchers in trans-municipal partnerships. To answer my initial aim of the study, involving researchers can benefit municipal co-creation of knowledge by researchers providing critical reflection (reframing) in the learning processes. Not all researchers can fulfill this role. Double- or triple-loop learning requires a critical attitude. Thus, it depends on the paradigm of the researcher if they can provide such critical reflection. If a project aims at higher-loop learning, this needs to be explicitly formulated in the aims and reflected in the structure of the project. Clarifying the role of the researchers in the structure (methodological framework) avoids disappointment by practitioners who might expect a traditional science advice role of researchers. Moreover, only if researchers are given the mandate to provide reflection, can it occur. Reflection can be fostered through specific milestones, but optimally it should occur at all phases in the research process. Support from high-level officials or politicians is crucial for the outcomes to have a practical impact.

My research shows that transdisciplinarity is deeply intertwined with the ideas of the BBF. I have exposed the logical relationship between the principles for transdisciplinary research in the Lang et al. (2012) framework in a municipal context. But the principles also cross-connect to other elements of the BBF, making this research an important enhancement to the BBF. Apart from that, I clarified some connections between the elements of the BBF in relation to transdisciplinarity. With this study I do not mean to show to what extent the BBF already accommodates transdisciplinarity (which one could argue for), but to clarify exactly *how* transdisciplinary thoughts can enhance municipal partnerships designed along the BBF.

The Lang et al. (2012) framework shows greatest overlap with the BBF in the mutuality, valuation and reframing elements. The goal of the BBF to create mutual, open, and trustful relations between project participants, leads to appreciation of the generated knowledge, which is a precondition for its dissemination outside of the project. Reframing can only take place if the knowledge is disseminated to wider circles, since it is by definition critical and aims to transform current practices, norms and values. I have emphasized the role of researchers to facilitate reflection on what sustainability means in urban planning and what one's own role is in it. However, researchers can only fulfill this crucial function if the project is structured accordingly. A collaboratively framed understanding of the problem and aims of the project that give space for reflection and are specific about the practical application of the knowledge, lead to an appropriate methodological framework on how to conduct transdisciplinary research. A strong integration of academic disciplines through a project structure that fosters interdisciplinary dialogue is necessary to achieve transformational results, due to

different research paradigms of the involved researchers. Disseminating (and assessing the impact of) reframing outcomes is difficult, due to their usually informal nature.

UTÖ can be seen as a good example for a trans-municipal partnership and reflected many of the known challenges in transdisciplinarity and organizational learning theory, on which the BBF is based. The BBF has proven a valuable framework for analyzing it, but more research is necessary to ground it even more firmly in sustainability science, enhance it towards other factors in municipal learning, and test its validity. The combination with transdisciplinarity carried out in this study is just one of the stepping-stones towards a BBF tightly connected to sustainability science, but has proven the relevance of the BBF for designing successful municipal learning partnerships for sustainability. The findings of this study will help municipalities and city networks to more effectively design learning partnerships for sustainability to ultimately contribute to a transition towards sustainability.

7 References

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List of Documents

Below is a list of internal documents used for the background information and analysis of the Urban Transition Öresund project.

In-text code	Document name	Year	Description
APPL_UTÖ	Ansökan om medfinansiering från EU interregmedel och norska interreg-midler	2011	Project application for EU Interreg IV A funds
EVAL_UTÖ	Opsamling og evaluering af projektet Urban Transition Öresund 2011-2014	2015	Final evaluation of the project
PART_FORUM1_UTÖ	Deltagarlista Urban Transition Forum 25 maj 2012	2012	Participant list Urban Transition Forum May 25, 2012
PART_FORUM2_UTÖ	Deltagarlista Urban Transition Forum 13 november 2012	2012	Participant list Urban Transition Forum November 13, 2012
PART_FORUM3_UTÖ	Deltagarlista Urban Transition Forum 19 september 2013	2013	Participant list Urban Transition Forum September, 19 2013
PART_FORUM4_UTÖ	Deltagare Urban Transition Forum 28 februari 2014	2014	Participant list Urban Transition Forum February 28, 2014
PART_FORUM5_UTÖ	Deltagerliste Urban Transition Forum 28 Maj 2014	2014	Participant list Urban Transition Forum May 28, 2014
PART_FORUM6_UTÖ	Participants UTF September 2014 in Copenhagen	2014	Participant list Urban Transition Forum September 2014

Appendices

Appendix I: List of project partners in Urban Transition Öresund

- Aalborg University Copenhagen (DK)
- City of Ballerup (DK)
- City of Copenhagen (DK)
- City of Lund (SE)
- City of Malmö (SE)
- City of Roskilde (DK)
- Lund University (SE)
- Malmö University (SE)
- Roskilde University (DK)
- Swedish University of Agricultural Sciences (SE)

Appendix II: Formal outcomes of Urban Transition Öresund by working group

Sustainable planning processes (Urban Transition Öresund, n.d. b)

- Note on physical planning In Sweden and Denmark
- Three articles on citizen dialogue
- Leaflet on dialogue with building developers
- Folder on new working methods in urban planning to foster long-term thinking

Guidelines for sustainable construction (Urban Transition Öresund, n.d. c)

- Essay on recommendations for sustainable construction

Sustainable finance (Urban Transition Öresund, n.d. d).

- Note on main conclusions of working group
- “Total Value” model
- Article on transaction costs of energy efficiency projects
- Overview of experiences on financing sustainable construction in Denmark
- Overview of experiences on financing sustainable construction in Sweden
- Research note on international experiences on energy efficiency renovation financing models
- Presentation of overview of international energy efficiency renovation financing models
- Report on international experiences on energy efficiency renovation financing models
- Presentation on transaction costs
- Evaluation of application of the “Total Value” model
- Guide on financing for energy-efficient renovation for builder-owners
- Scientific paper: Haldrup & Snällfot (2014) (0 citations on Scopus & Google Scholar as of 26/4/2015)

New forms of collaboration (Urban Transition Öresund, n.d. e).

- Urban Transition Manifest
- Board game for citizen involvement
- “Triangle” cards for fostering and structuring dialogue
- Contribution to Urban Studies exhibition (“Staden Studerad” in Malmö) incl. short film on the board game
- Grey literature: Agger Eriksen, Brandt, Mattelmäki, & Vaajakallio (2014) (0 citations on ACM Digital Library as of 26/4/2015); Agger Eriksen, & Vaajakallio (2013) (1 citation on Google Scholar as of 26/4/2015); Reimer, Nilsson, McCormick, & Toftager Larsen (2012) (no bibliometrical data found); Reimer, McCormick, Nilsson, & Arsenault (n.d.) (1 citation on Google Scholar as of 26/4/2015).

Unrelated to specific working groups

- Grey literature: Smedby, N. (2014) (no bibliometrical data found); Delshammar, T. (2014) (no bibliometrical data found); Delshammar, T. (2011) (no bibliometrical data found)

Appendix III: Sample Overview

Table 4. Sample details (satisfaction scale ranged from 1 (very low) to 4 (very high))

In-text code	Occupation	SWE / DK	Satisfaction with learning outcomes	Educational Background
INT_1	Practitioner	Swedish	3	Political Science
INT_2	Practitioner	Swedish	3	Urban Planning
INT_3	Researcher	Danish	3	Urban Planning & Geography
INT_4	Practitioner	Danish	2	Architecture
INT_5	Practitioner	Danish	3	Political Science
INT_6	Practitioner	Swedish	3	Engineering
INT_7	Practitioner	Swedish	3	Social Science
INT_8	Researcher	Danish	4	Urban Planning
Sums:	75% Practitioners 25% Researchers	50% SWE 50% DK	Mean: 3.0	-

Appendix IV: Transcription Rules

- Code for Respondent = B; Code for Interviewer = I
- Paragraph breaks when speaker changes
- Pauses signaled by: (...)
- Breaks in the sentence signaled by: /
- Nonverbal communication in round parentheses, e.g.: (B laughs)
- Underline strong emphases in pronunciation
- Incomprehensible parts are marked by: (incomprehensible)

Example of transcribed segment:

I: Mhm, okay. So looking a bit at the different cultural backgrounds: Do you think it was a big difference between the Swedish and the Danish side?

B: I do not think the cultural backgrounds made a difference. But the framework /, the legal framework that we had to work with. The regulations, the building regulations and all these kind of things are different it turns out. Very different. In Denmark and in Sweden. In Denmark we can do things that Swedes cannot and vice versa. So that was actually, not necessarily a problem, but something that we discussed. We did not have the same possibilities of producing sustainability (incomprehensible).

I: Mhm. So there was /. And between other groups, let's say between municipalities or also again between the practitioners and the researchers. Do you think that there was some kind of working culture differences?

Appendix V: Interview Guide

Interview about Urban Transition Öresund, questions about

1. Your learning process in the project
2. Collaboration between researchers and practitioners

Study will help to develop a framework further that is to support municipalities to design learning partnerships for sustainable urban planning, called the Ball-Bearing Framework (developed at LUCSUS). UTÖ is the perfect project to look at because I am focusing on the collaboration between researchers and practitioners and how that influences the learning processes.

I would like to record the interview, but all answers will be anonymous – I will only refer to you as interviewee or participant, nothing you say will be connected with your name or other compromising data and I am the only one to listen to the recording.

That being said, is it okay that I record the interview? Yes No

(At all questions if they mention problems: How would you improve this point? What would have to be done differently? Questions in italics only used as further stimulation if necessary.)

Characterization of UTÖ partnership through the Ball-Bearing Framework

Mutuality

- a. Please describe the nature of the partnerships within UTÖ. *Did you feel on the same level as everybody else or was a “teacher-student” relationship? Was it mainly one side talking or did everybody have the chance to speak up?*
- b. Do you feel like your input was appreciated by the other participants of the project?
- c. Do you think that all groups are equally represented in the outcomes of the project (e.g. Urban Transition Manifest)? *Does it feel like you “co-created” knowledge?*
- d. Did the participants take the project equally serious?

Communication

- a. Did you always have a clear understanding what other participants meant? Did everybody share the same understanding of important concepts (e.g. sustainability, participation, etc.)? Was there a shared vocabulary of the participants? How did the communication between researchers / practitioners go? Did they use different words or interpreted them differently?
- b. How did the participation of people from different countries affect the communication in the project? Did you experience any language barriers or misunderstandings arising from not listening to or speaking your native language? Which language was used most?
- c. Was it beneficial or detrimental to work with people from different backgrounds (nationality, education, practitioners/researchers, different municipalities, different universities)? Were there any differences in the working style or procedures etc?
- d. Did you have facilitators / moderators during the discussions? Did they help you to understand each other and “translate” (not just language but also meaning) between the different groups in the project?

Backup questions:

- e. Could you always follow other participants’ arguments? If not, did you ask for clarification?
- f. Do you think other participants could always follow your arguments? Did anyone ask for clarification?

Valuation

- a. What was your motivation to participate in the project?
- b. Do you feel acknowledged for participating in the project? *Did you get any means by your employer to contribute to the project? Could you officially allocate time to the project?*
- c. Did your colleagues and superiors support you in participating in the project? Were they interested to hear what you learnt?
- d. Was there any kind of formal recognition from your employer for participating in the project? (For example a certificate?)
- e. Do you think it was worthwhile participating in the project? What did you get out of the project yourself? What activity was most important or helpful for your own learning and why?
- f. Looking back, would you participate in it again?

Dissemination

- a. Do you think that all participants have the same level of knowledge after participating in the project? *What activity was the most helpful in spreading the know-how of different people?*
- b. Are you the only one at your institute / department / municipality / university who knows about the results of Urban Transition Öresund or do your colleagues and superiors also know about the outcomes?
- c. How were the results of the project distributed in your municipality? *Were there any milestones or other formal activities when you reported about the things you learnt in the project?*
- d. Were there any informal ways of spreading the knowledge? *Did you expand your network through the participation in the project?*
- e. Was the organizational and political structure of your municipality helpful or unhelpful for sharing your experiences? Was there any opposition against disseminating the results?
- f. Either: In the evaluation questionnaire you marked that UTÖ inspired a new project for you. What exactly did you take out of UTÖ that you use for the new project now? Do you actively use any of the outcomes of UTÖ?
- g. Or: In the evaluation questionnaire you marked that UTÖ did not inspire you directly in terms of a new project. Did you take something else out of UTÖ that you use for your work now?
- h. For Malmö interviewees: Have you participated in the TangMa city partnership? Reframing: If yes, have any of the outcomes had a substantial, long-lasting impact in the municipality?

Reframing

- a. Do you see sustainability problems (in your municipality) from a different perspective after participating in UTÖ?
- b. Do you see the work of your municipality from a different perspective after the project? Did it help you answer why you are doing what you are doing in your municipality?
- c. Did Urban Transition Öresund have an influence on the way you work in your municipality or did it result in any new projects in your municipality (i.e. what you do)? Did it help you identify leverage points how to support a sustainable transition of your city? Did your department or whole municipality reflect on what it learnt from you?
- d. Practitioners: Did the involvement of researchers help you to reflect on what you are doing in your municipality? *Did they help you question what your municipality was doing or did they rather help you solve pressing problems?*
- e. Researchers: Did the involvement of practitioners make you reflect on what and how you were doing research?

Transdisciplinarity

Phase A

All:

- a. How were participants for UTÖ chosen? Was there transparent criteria and a clear process for selecting participants?
- b. Was the project process structured in a clear way? What was the goal of the project?
- c. Did you define the problems you wanted to tackle together? (With both researchers and practitioners?) *Do you feel that you were part of a collaborative research team?*
- d. Do you think that you tackled the “right” problem from the “right” angle?
- e. Was there a clear framework how to integrate knowledge from practitioners and researchers?

Phase B

a. All:

- a. How involved have the researchers been in the project? Did they influence the direction of the project?
 - b. How was the general public included in the process?
 - c. How would you describe your role in the project? Was it clear to you what was expected from you in the project?
 - d. On a scale from 1 (very little) to 4 (very high), how involved would you say you have been in the project?
- b. Researchers: How did you carry out your research in UTÖ? Did the transdisciplinary nature of the project influence your choice of methods?
- c. Practitioners: Have you been actively involved in designing the studies of the researchers? Did you develop methods, tools, etc. together?

Phase C

a. All:

- a. Do you think that the cooperation between universities and municipalities helped to generate sustainable results?
 - b. Do you feel more empowered to do your job through the project?
 - c. How were the learning outcomes translated into concrete products for practitioners and researchers?
- b. Researchers:
- a. How vital was your research for the outcomes of UTÖ? Did the interaction with practitioners modify the Research Questions you asked? Did it influence your choice of methods?
 - b. Have you received any criticism regarding the scientific credibility of your work due to working with practitioners?
 - c. Would you say that the researchers in the project inspired critical reflection on the (problem definition,) methods and outcomes?
 - d. Do you think that it was a truly transdisciplinary research process? Did the results of UTÖ influence your own research results and conclusions? If yes, in what regard?
- c. Practitioners: Would you say that there was a transfer of knowledge not just from researchers to practitioners but also the other way around?

Last: Is there anything else you would like to mention?

Appendix VI: Urban Transition Öresund Evaluation Survey Questions

This list depicts all questions used in the final project evaluation of UTÖ. Questions 8 - 13 were only shown to practitioners, questions 14 - 19 were only shown to researchers.

1. To what extent did the Urban Transition Öresund program fulfill your expectations in terms of learning?
2. Why did the Urban Transition Öresund program fulfill / not fulfill your expectations?
3. Which activity within the Urban Transition Öresund program was the most helpful to you?
4. Why was this activity the most helpful to you?
5. Which municipality was particularly inspiring for your own work?
6. Why was this municipality particularly inspiring for your own work?
7. Please state if you work for a municipality at a research institution.
8. Did you learn anything or got inspired from working with other municipalities in Urban Transition Öresund?
9. What did you learn anything or got inspired from working with other municipalities in Urban Transition Öresund?
10. How important was the contribution of universities to your learning experience?
11. If it was important, what did you learn or what inspired you from working with universities?
12. Did you experience any difficulties working with universities in Urban Transition Öresund?
13. What difficulties did you experience in working with universities within Urban Transition Öresund?
14. How important was the collaboration with municipalities for your learning experience and research?
15. If it was important, what did you learn or what inspired you from working with municipalities?
16. Did you experience any difficulties working with municipalities in Urban Transition Öresund?
17. What difficulties did you experience in working with municipalities within Urban Transition Öresund?
18. Did you learn anything or got inspired from working with researchers from other universities and disciplines in Urban Transition Öresund?
19. What did you learn or what inspired you from working with researchers from other universities and disciplines?
20. Have you implemented some of the findings from the Urban Transition Öresund program in your organization or has the Urban Transition Öresund program led to new projects or new collaborations?
21. How have you implemented the findings from the Urban Transition Öresund program in your organization or to what new projects or new collaborations has it led to?
22. What is the single most important learning outcome from the Urban Transition Öresund program to you?
23. Did the cross-border character of Urban Transition Öresund influence your learning experience?
24. Please describe how the cross-border character of Urban Transition Öresund influenced your learning experience.
25. Please provide your name.
26. Please choose which organization you belong to.
27. Please indicate your age.
28. Please indicate your gender.
29. What is your educational background?