Examining the dynamics of social cohesion: A call for a different perspective on scaling impacts of real-world laboratories

Social cohesion is an important impact category for scaling real-world laboratory experiments. This idea has been largely overlooked in the transformative research debate. Based on observations within real-world laboratories that focused on iterative, co-creative, and practice-based climate change adaptation, we identify social cohesion, first, as a prerequisite for real-world laboratory impacts. Second, social cohesion can itself be an impact, enhancing the scaling potential of real-world laboratories. Cooperation can pave the way for amplifying real-world laboratories' activities temporally and spatially.

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Real world laboratories (RwLs) aim to generate knowledge on the dynamics and the mechanisms of societal transformation, as well as to initiate transformation processes in a spatially and temporally defined social setting (Parodi et al. 2016, p. 16). Despite the importance of long-term institutionalization and the scaling of activities to contribute to societal transformation, there is relatively little research on these topics (Augenstein et al. 2020). Kern and Haupt (2021) point out that scaling the innovative approaches and activities often remains a wish rather than a reality in RwL projects. Research in RwLs typically focuses on describing the development of the RwL setting, while leaving out the temporal and spatial process of diffusing generated knowledge and impacts.

The concept of scaling is multidimensional and in many ways remains unclear (Augenstein et al. 2020). Researchers present a variety of conceptual, methodological, and theoretical perspectives on scaling that goes well beyond RwL research (e.g., Van den Bosch and Rotmans 2008, Ehnert et al. 2018, Lam et al. 2020). Lam et al. (2020, p. 3) define "scaling" as the amplification processes that purposefully increase the transformative impact of sustainability initiatives. Based on a literature review, the authors provide a typology that distinguishes amplifying 1. within (e.g., prolonging the impact of one initiative), 2. out (e.g., creating an impact for other people and places), and 3. beyond (e.g., changing how initiatives create impact; Lam et al. 2020). We define scaling broadly as a process which aims to permanently embed RwL activities into local structures, practices, and cultures (i.e., temporal scaling, which relates to amplifying "within"; Lam et al. 2020) and aims to transfer the experiments to other contexts (i.e., spatial scaling, which relates to amplifying "out"; Lam et al. 2020, Kern and Haupt 2021). A variety of studies identify the following criteria as essential factors in the scaling process:

- access to follow-up funding (Schaufler and Staffa 2020, Schecke et al. 2021, Kern and Haupt 2021);
- the institutionalization of cooperation in some form (e.g., within the structures of public administration; Schaufler and Staffa 2020, Kern and Haupt 2021); and,
- the building of persistent networks (Schaufler and Stauffa 2020).

Even though these could be relevant explanatory categories for the temporal continuation of RwL activities, the spatially oriented scaling of RwL impacts is a process whose dynamics are not fully understood (Augenstein et al. 2020, Kern and Haupt 2021). The question remains how context specific RwL knowledge can be passed on to different settings and can be taken up by new actors. At the same time, the temporal scaling of RwL activities can also raise questions of how to foster stable networks during the implementation of the RwL, to provide a foundation for long-term institutionalization.

Considering the lack of research on how to amplify RwL impacts, we want to take a closer look at some experiences from the RwLs of the Bundesministerium für Bildung und Forschung (BMBF) funded *GoingVis*[1] project *(Governance by integrative vi-*

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1 *https://www.goingvis.de*

FIGURE 1: Real-world labs engage citizens in collective adaptation action, by linking the experimentation process with local narratives.

sions). Based on our observations we propose that social cohesion is not merely a prerequisite and potential outcome of RwL activities. We present a novel perspective by introducing social cohesion as an explanatory factor for the success of scaling RwL impacts that can lead to wider transformation processes. We hypothesize that social cohesion is a factor that has been overlooked in research and practice but can be essential for impact diffusion of RwLs. Therefore, social cohesion can help free RwLs from their image as deadlocks for transformation. This forum article aims to present initial thoughts and hypotheses on the potential links between social cohesion and RwL scaling to stimulate further discussion.

Observations on scaling real-world laboratory impacts from the *GoingVis* project

The goal of the BMBF funded *GoingVis* project was to initiate RwLs that develop co-creative and inclusive climate change adaptation processes. When the project started in 2016, resilience to climate change was a topic that small and medium sized municipalities in Germany rarely took up in a strategic way. The focus of adaptation policy and research was on large cities that advanced this topic with top-down, technocratic, and planning centered concepts, which were implemented only rudimentarily (Brunnengräber and Dietz 2012, UBA 2017). The two *GoingVis* RwLs, *PLATZ-B* (located in the small town of Boizenburg, Mecklenburg-Vorpommern) and *Leuchtturm LOUISE* (located in Elbe-Elster, Brandenburg), put the local population, their own topics, favorite places, and narratives as the starting point for their activities (figure 1). Both RwLs focused on developing climate change adaptation in an iterative and collaborative way (Mitchell et al. 2022). Yet, the main questions of the overall project were 1. whether collaborative adaptation experiments can have an impact that goes beyond single events, and 2. how activities that are primar-

ily voluntary in nature can create long-term awareness, activities, and impact.

Amplifying *GoingVis* real-world laboratory impacts by temporal scaling

One example for temporal scaling of RwL activities is an experiment that involved the conversion of a bus stop in Boizenburg. Boizenburg students created a green and shaded hideaway after winning a school competition on visions for the city, initiated by the *PLATZ-B* RwL project. In 2020, they implemented their idea to improve Boizenburg's adaptation to climate change. Different local actors supported the student activities by giving advice on the technical feasibility of the project and the selection of climate-adapted plants, as well as aiding them to acquire financial support. Temporal scaling manifested in a reconfiguration of social practices, which led to a long-term responsibility for the green bus stop. The students voluntarily and regularly support the small-town administration in the maintenance of the green bus stop (e.g., by watering plants and fixing vandalism; figure 2). RwL activities provided conditions for a group of people with common values and an already strong interpersonal trust to realize their local vision. The students became part of a wider social network of actors involved in community engagement, embedding their experimental activities in long-term urban development.

Another temporal scaling example of an RwL initiated adaptation experiment developed in a different manner but is similarly grounded in local citizen networks in Boizenburg. Since the summer of 2020, a group of citizens has undertaken the responsibility to make an orphaned park fit for climate stressors (figure 3, p. 54). An experiential public walk, initiated as part of the RwL experiments, brought residents together. They were unfamiliar with each other, but shared a common interest in the city park, as a place that holds personal memories for many in Boizenburg. Since then, regular meetings of those who attended the walk have taken place under the self-chosen name *Stadtparkfreunde*. This initiative fostered a more extensive communication process within the administration of the town of Boizenburg and has brought the park back into the public consciousness. The RwL activities of the citizen-initiated *Stadtparkfreunde* included communicating with local politicians about the park, with the church that gave access to adjacent areas in its possession, and with the association that carries out the maintenance work within the park. The activities of the *Stadtparkfreunde* thus became the catalyst for harmonizing adaptation activities and future perspectives for the park with other urban actors. A formal acknowledgment and institutionalization of the *Stadtparkfreunde* in an official cooperation agreement with the town of Boizenburg in 2022 was one more step in the temporal scaling of the RwL activities. The RwL functioned as a connector for different local actors, building interpersonal and institutional trust that facilitated long-term adaptation work beyond its own existence.

Spatial scaling of the impacts of *GoingVis* real-world laboratories across partner towns

Besides creating longer-term impacts with the activities of RwLs, one of the major questions discussed in the RwL community is how to extend spatial impacts beyond single experiments. Observations in Boizenburg and Elbe-Elster give some interesting insights on that matter within the local urban space. As citizens observed the effects of heat and drought in the region (especially in their own gardens), the *GoingVis* RwL in Elbe-Elster initiated the *Irrigation Network* to exchange experiences and knowledge on climate-adapted green space maintenance. The network does not consist of a fixed group of people, but constantly expands through a snowball effect. Citizens needing garden help and advice invite network participants to meet through the RwL coordinator. The group that gathers in the respective green space discusses observations of changes in nature, adapted plant selection, and efficient irrigation systems. Together, the participants consider how drip irrigation or rainwater can be used to alleviate drought stress, taking the specifics of each green space into account. The network is an arena for knowledge exchange, rather than the proclamation of top-down expertise. It also creates a strong sense of self-efficacy amongst the members that are then able to brace against the detrimental impacts of a changing climate. With every meeting and every garden tour, more people join the network, and the jointly developed ideas are carried forward. Through many smaller contributions to climate change adaptation, a broader impact is unfolding for the preservation of cooling green spaces in the region. These include not only private allotments, but also green spaces surrounding nurseries. The network connects the personal interests of preserving one's own garden with common goods, such as climate-adapted water and green space management.

The collaborative process of greening a bus stop did not simply lead to adaptation activities of the student group in the one experiment mentioned above. The green bus stop is located on a busy road connecting the train station with the center of town, thus guaranteeing high visibility. Numerous people see the landmark every day and saw the process of its construction in Boizenburg. Some of them initiated a process of creating another green bus stop in their own neighborhood. The single experiment became a starting point for a diffusion of collaborative adaptation activities. Similar developments could be observed with different collaborative activities triggered by the RwLs. Other examples are a joint tree planting initiative that inspired a local entrepreneur in Boizenburg to propose the creation of a community garden and provided financial support for a community garden created by the local population.

In the process of following these RwL activities and evaluating their temporal continuity and spatial transferability, we became more and more aware of the importance of social networks, common visions, as well as social and institutional trust and belonging. We therefore wondered if, with the formation of networks and local communities, social cohesion plays a significant

FIGURE 2: Students from Boizenburg, Mecklenburg-Vorpommern, carried out a bus stop greening project after winning the competition *Boizenburg future-proof* – an initiative of the real-world lab *PLATZ B*.

role in the scaling of RwL activities. In the following, we will highlight some of our considerations.

Social cohesion: An overlooked mechanism in scaling the impacts of real-world laboratories?

Observations in the *GoingVis* RwLs provide insights into the ifs and hows of scaling experiments in time and space. The RwLs that focused on enhancing collective practices of climate change adaptation reveal social cohesion as an important prerequisite for the effectiveness of the RwL activities, but also as an outcome of the RwLs' experimentation process. To the authors' knowledge, up until now social cohesion has not been discussed as a stand-alone impact category for the scaling processes of RwL activities. We understand RwL scaling not merely as a measure of knowledge transfer, but as a process that involves the expansion of social networks and collective ownership among the involved stakeholders enabled and mediated by social cohesion. To provide a foundation for our thoughts, we first explore the concept of social cohesion and its multifaceted dimensions, before delving into its role in RwL research.

The idea of social cohesion as a mechanism in RwL scaling processes is related to the multiplicity of the concept. To approach this idea, it is necessary to look at what constitutes social cohesion in the context of RwLs, and where connections arise with the topics and the self-conception of RwL research. When addressing complex real-world problems of sustainability transformations and societal challenges through collaboration, the aim of RwL research strongly intertwines with the need for a supportive social setting. RwLs aim to generate knowledge that is embedded in their social environment, but also aim to change it. Consequently, they are dependent on the interest and commitment of their target group, and the objective is to leverage the

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FIGURE 3: The *Stadtparkfreunde* during a planting event to revive a city park in Boizenburg, Mecklenburg-Vorpommern.

positive power of bonding forces between participants towards a common goal to achieve more equitable and persistent outcomes. Trust, social capital, and ultimately social cohesion can and should be one of the goals RwL activities aim for. The impact of an RwL is directly related to the type of cooperation in the laboratory and the experiments. When there is a high sense of belonging and trust among the actors involved, they are more likely to collaborate, exchange resources and knowledge, and share experiences and skills to solve problems together. On the one hand, social cohesion leads to individual actors working towards a common understanding and developing a collaborative perspective. Thus, cohesion can become a determinant of RwL success[2]. Social cohesion in already existing networks can advance RwL experiments, as was the case in the bus stop experiment in Boizenburg. On the other hand, RwL structures can also lead to net-

Social cohesion requires many actors who have an interest in combining collective common goods and individual freedom (Kersten et al. 2022). This dynamic also underlies the transdisciplinary work in RwLs. Sustainability transformations are contested and bear the potential for conflicts between different societal groups. RwL activities can bring underlying conflicts to the open. Deliberative dialogue is considered of high importance for the outcome and the scaling of RwLs, as it highlights different problem definitions and helps to avoid catalyzing conflicts among participants (Sonnberger and Lindner 2021). Our experiences in Boizenburg and Elbe-Elster demonstrated that, especially in small towns, there is a need to take special care to avoid jeopardizing local cohesion through poor RwL execution (e.g., by expectation management).

When RwL research is connected to the needs of the local community, it unveils new prospects for action within the urban space. This can lead to initiatives that the community implements itself. This approach not only fosters implementation, but also holds potential for replication and scalability. However, this framework sets certain limitations on the concept of leveraging social cohesion for scaling RwLs. Social cohesion predominantly plays a role in scaling RwL experiments that are rooted in the *Lebenswelt*[3] (Schütz and Luckmann 1975) of a city, and those RwL activities that acknowledge local cultures or refer to the immediate experiences and perceptions of people's everyday environment, as the *GoingVis* RwLs did. In these instances, the consideration of local needs, topics, and narratives surrounding climate change adaptation allowed for a high involvement and identification among local actors (figure 4). In RwLs primarily focused on technical or infrastructural solutions, the integration of local narratives, themes, and cultural aspects might be less emphasized, potentially impacting the role of social cohesion in scaling such endeavors.

Examples of qualitative indicators related to the different dimensions of social cohesion might include the development of local networks, the emergence of shared future visions, or the exploration of new practices and cultures.

work building among local actors who did not know each other before participating in the RwL. RwL activities then might reveal common ideas about the future, life in the city, and a common sense of belonging, as the example of *Stadtparkfreunde* demonstrates. We want to point out that the connection between scaling RwL activities and social cohesion is recursive. It can be considered a prerequisite that actors are able and willing to cooperate to set up an RwL and to scale it, but social cohesion can also be an outcome of RwL activities. Stronger networks, extended engagement, and cooperation towards a common goal in RwLs can help reach social tipping points (Lenton 2020, Eder and Stadelmann-Steffen 2023) that pave the way for amplifying RwL activities temporally and spatially.

Open questions for further research

We view social cohesion as a promising factor in the process of scaling RwL knowledge and impacts, which opens interesting questions for research. Our observations in the *GoingVis* RwLs revolve particularly around the scaling of single experiments; it

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2 In contrast, Klaever et al. (2024, in this issue) discuss the impacts of conflict in RwLs.

3 Activities in the *GoingVis* RwL are rooted in immediate experiences and perceptions of people's everyday environment, the so-called *Lebenswelt*. We embrace a phenomenological understanding of the term *Lebenswelt* in the tradition of Schütz and Husserl.

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FIGURE 4: A planting initiative at a local primary school near the *Leuchtturm LOUISE* real-world lab (located in Elbe-Elster, Brandenburg), in collaboration with both primary and high school students.

remains to be seen as to what role social cohesion may play in the scaling of RwL processes and structures that enable these collaborative experiments.

The observations provide first clues on possible indicators related to the different dimensions of social cohesion, which could be part of a systematic impact analysis of RwLs and could stimulate further empirical investigations. Examples of qualitative indicators might include the *development of local networks,* the *emergence of shared future visions,* or the *exploration of new practices and cultures.* Further analysis is needed to determine which indicators can best depict the multi-layered nature of social cohesion concepts.

One of the most exciting but also complex questions regarding the scaling of RwL impacts remains the interplay between social cohesion, climate justice, and equity. The *GoingVis* RwLs have faced this dimension only to a limited extent. For instance, they encountered significant hurdles in the inclusion of representatives from marginalized groups in the collaborative adaptation process. Often citizens that are already actively engaged in the community also take part in RwL activities. It is important to examine who is excluded from RwL activities and why (e.g., lack of time, resources, knowledge, etc.) and who has a voice in the RwL initiatives (Sonnberger and Lindner 2021). The harmful consequences exclusion can have for scaling RwL impacts requires further attention, as this could potentially lead to an amplification of non-representation of the most vulnerable people.
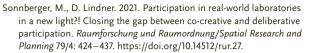
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