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Between Normativity and Objectivity: Transdisciplinarity as Situated Intervention

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The research mode that has gained prominence under the designation "transdisciplinary research" (TDR) has given rise to a multitude of definitions and critiques. While some posit that this research mode enables the sciences to address the mounting societal expectations to confront and potentially resolve significant societal challenges, others perceive it as a threat to the scientific system, its autonomy, and its objectivity. This article addresses this ongoing debate surrounding the tension between scientific objectivity and the normatively charged contexts of societal interventions. The objective is to propose a conceptual framework for resolving that tension by reframing TDR as a "situated intervention." This conceptualisation does not imply that interventions are merely locally contingent experiments. Rather, they are situated *within* sociologically interpreted normative complexities, which become the empirical object of TDR. Consequently, situated interventions are antithetical to the mere application or implementation of scientific knowledge. They represent a distinct scientific research approach of acquiring and producing knowledge. This conception of TDR is illustrated by the introduction and evaluation of the real-world laboratory (RWL) "Knowledge-creates-politics," which intervened in policymaking processes concerning the enhancement of citizen participation in Bremen, Germany.

Keywords: transdisciplinarity, interdisciplinarity, real-world laboratories (RWL), situated intervention, normativity, reflexivity

Introduction

Inter- and transdisciplinary research formats were first introduced in the 1960s and 1970s to better approach complex societal issues from a scientific perspective. The idea was to incorporate or merge concepts and methods from different pools of knowledge to facilitate problem-oriented research and produce multi-faceted, application-oriented findings. Both research modes are receiving increasing attention in current discussions on "grand societal challenges" or "wicked problems" (such as sustainability, democratic backsliding,

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demographic transition, etc.). Today, debates around the concept of "wicked problems" and the role sciences can and should play in "solving" them, have been disseminated into nearly all disciplines (Kaldewey, 2018, p. 170; Lawrence et al., 2022, p. 45).

Interdisciplinary research, which involves the collaboration and joint investigation across different academic fields, has gained widespread acceptance as a distinct mode of inquiry. Transdisciplinary research (TDR), on the other hand, still elicits a diverse range of conceptualisations and problematisations, despite the term's history dating back at least 50 years when considering Jantsch (1970) and Piaget (1972) as first crucial publications. TDR is understood here as a distinct mode of research that addresses socio-political problems by bringing together a diverse range of academic and non-academic actors, in order to collaboratively produce evidence-based, application-oriented knowledge and to influence societal problem-solving strategies (Lang et al., 2012, pp. 26–27). Evidently, TDR diverges considerably from established rules, norms and procedures of the academic system. This discrepancy gives rise to the philosophical question whether and to what extent scientific endeavours can be aligned with the objective of (political) social engineering. More specifically, the core philosophical challenges of TDR are a) whether scientific objectivity can be reconciled with the normative dimensions of its research object, as well as the conflicting interests, ethics, and values held by participating societal actors and b) how it re-connects to (inter)disciplinary "basic research."

This article will focus primarily on the first question by introducing a distinct understanding of TDR as situated intervention following Zuiderent-Jerak (2015). This conceptualisation does not imply that interventions are locally contingent experiments, but that they are situated within sociologically interpreted normative complexities that become the empirical object of TDR. Consequently, a transdisciplinary situated intervention is the opposite of merely applying or implementing scientific knowledge in practice. Instead, it is a distinct scientific approach of acquiring and producing research-based, application-oriented knowledge (Zuiderent-Jerak, 2015, chapter 1, pp. 19, 23). This article will illustrate and reflect on this understanding of TDR by describing and reflecting on the transdisciplinary real-world laboratory called "knowledge-creates-politics." It was conducted in Bremen, Germany, from 2021 to 2023, and sought to intervene in an ongoing process of policy formulation aimed at increasing the opportunities for citizen participation in local policymaking procedures.

Transdisciplinarity as Distinct Mode of research—A Literature Review

The term "transdisciplinary research" (TDR) continues to evoke disparate understandings and conceptualisations (von Wehrden et al., 2019, p. 875). Broadly speaking, there are two distinct conceptualisations of TDR: the "Nicolescuian" school and the "Zürich" school (Klein, 2021, p. 19; Lawrence et al., 2022, pp. 46–47). Both approaches are based on the premise that (social) sciences should adopt a more deliberate approach to promoting the "common good." This understanding necessitates that TDR addresses issues and challenges that originate from societal discourse (and not primarily from scientific curiosity) (Gethmann et al., 2015, p. 9). In this vein, Schmidt (2022) characterises the objects of interest for transdisciplinary research as "trans-epistemic, extra-scientific, or real-world issues" (p. 30). Such issues are frequently associated with the so-called "grand societal challenges" or "wicked problems."

The Nicolescuian school has its origins in CIRET (the International Centre for Transdisciplinary Research and Studies), which was established in 1987 under the presidency of Basarab Nicolescu. It advocates a transdisciplinary research approach that recognises the necessity of respecting and integrating a multitude of points of view, including both abstract (i.e. academic) and case-specific (i.e. life-world) knowledge, in order to create a more substantial and comprehensive understanding of complex problems (McGregor, 2018, pp. 186–187). The Nicolescuian school thus advocates for multi- and interdisciplinary research collaborations with the objective of attaining a more profound comprehension of the world by transcending the boundaries of conventional scientific disciplines. It is only through multifaceted contributions from numerous disciplines and an understanding of the "local contextual dynamics" (McGregor, 2018, p. 194) that innovative solutions to complex problems were to be derived and implemented. This would not only facilitate a more nuanced understanding of the world, but also inform more effective action in addressing the complex challenges of modern society (McGregor, 2018, p. 183). This understanding has been corroborated and built upon by a number of other scholars, including Mittelstraß (2018), Max-Neef (2005), McGregor (2018), Jaeger and Scheringer (2018), and Schmidt (2021).

Whilst the Nicolescuian school does recognise life-world knowledge as a central component to achieve a "greater unity of knowledge," this in turn does not necessitate the inclusion of non-academic actors into the research process (Lawrence, 2022, p. 47). This constitutes the most notable distinction between the Nicolescuian and the Zürich school of TDR, since the latter explicitly advocates for the involvement of societal actors in research processes and places greater emphasis on the intervening, even transformative notion of TDR (Lawrence et al., 2022, p. 48). The Zürich school of thought as conceptualised by the Swiss td-net (https://transdisciplinarity.ch/de) and related scholars

(e.g., Pohl & Hirsch Hadorn, 2008; Jahn et al., 2012; Bergmann et al., 2012; Defila & Di Giulio, 2018) is committed to fostering reciprocal knowledge exchange processes through the direct and systematic engagement with societal actors. Participation and co-creation of knowledge are thus the fundamental tenets of this approach. Focusing on specific "societal problems and concurrently of related scientific problems" (Lang et al., 2012, p. 26) as shared objects of interest, scientists engage in collaborative research with a wide spectrum of societal actors, including (but not limited to) representatives of political, economic, legal and artistic institutions as well as civil society. The participation of societal actors serves three objectives which in turn provide criteria for determining who should be involved (Di Giulio & Defila, 2024, p. 360):

a. Credibility: Non-certified experts[1] who derive their expertise from their profession. They contribute to certified expertise (provided by scientists[2]) with their technical or professional knowledge.
b. Salience: Future users or beneficiaries (e.g. practitioners, patients) that contribute to the co-creative knowledge production in terms of its practicability or applicability.
c. Legitimacy: Stakeholders and actors representing (affected) civil society. They can enhance the political and / or societal legitimacy of transdisciplinary knowledge production and its output.

The objective of collaboration is the resolution or transition of a societal and concurrent scientific problem through the differentiation and integration of knowledge from a multitude of scientific and societal bodies of knowledge (Lang et al., 2012, pp. 26–27). The integration of different bodies of knowledge is to be facilitated through a co-creative research approach. The term describes a process of co-designing a research project, co-producing knowledge throughout the project, and co-evaluating its output and (potential) outcomes (Defila & Di Giulio, 2018, pp. 39–40; Wanner, 2018, pp. 103–105). Continuous deliberations throughout the research project ought to facilitate fruitful deliberations on the respective perspectives of the problem at hand as well as the favoured practical solutions. The co-creative approach ought to achieve a higher degree of interpersonal trust and understanding which in turn facilitates the pragmatic resolution of the incongruence of expectations, patterns of interpretation, and problem definitions evident within and between social practice and science (Lang et al., 2012, p. 26; von Wehrden et al., 2019, p. 876; Pohl et al., 2021, pp. 18–19). There are, however, divergent scholarly perspectives on the evaluative criteria for transdisciplinary research projects,

1 Di Giulio and Defila build their conceptualisation of non-certified expertise on the studies of expertise and experience put forth by Collins and Evans (2002).

2 Given a distinct transdisciplinary research project, scientists are only deemed certified experts if they possess research-based expertise in a field that is pertinent to the shared object of interest (Defila & Di Giulio, 2018, pp. 39–40).

particularly in terms of their principal objectives. While some prioritise the societal impact of transdisciplinary research formats (e.g., Krohn et al., 2017; Hansson & Polk, 2018; Pärli, 2023), others contend that both the scientific and the societal impacts are crucial objectives (e.g., Hegger & Dieperink, 2015; Jahn et al., 2022; Marg & Theiler, 2023).

This article builds on the "Zürich school" in the sense that participation and co-creation are seen as crucial and significant elements of transdisciplinary research. Yet, this understanding of TDR calls into question the established conceptions of how scientific research ought to be conducted. TDR, therefore, constitutes an interesting, albeit challenging subject for the philosophy of science. This article will now present an analysis of the philosophical challenges inherent to TDR. Section 2.2. will then present a conceptualisation of TDR as situated intervention, which offers an intriguing and productive approach to reconciling the seemingly contradictory concepts of objective science and intervening in normatively charged contexts.

Transdisciplinarity and the Philosophy of Science

In order to address the question of how TDR (in accordance with the Zürich school) challenges established conceptions of scientific research, this article will first outline the fundamental tenets of basic (and predominantly disciplinary) research. The primary objective of science is to generate (preliminary) truths about specific research objects—or in other words: "to tell us, what is the case—regardless of human intentions, wishes or fears" (Gethmann et al., 2015, chapter 2, p. 18). Hence, scientists ought to be as objective as possible when conducting their research and are thus encouraged to avoid external influence and attempts at control. Therefore, the production of scientific knowledge—yet not necessarily the selection of research topics—should be as independent as possible of societal interests and values.[3] This is to say that the sole driver of knowledge production ought to be scientific curiosity alone, and the advancement of knowledge ought to be pursued for its intrinsic value,

3 These deliberations constituted the subject of the "value judgement controversy," which was a central debate in German social science in the early 20th century. The core question was whether science could and should be completely free of subjective value judgements. Max Weber, who was heavily involved in that controversy, argued that science should only be descriptive, that is, describing how the world is, and not normative, that is, how it should be. He argued that scientists should separate strictly their value judgements from their scientific work in order to ensure objectivity (Sharlin, 1974, pp. 349–350). In this context, Weber did not see the search for truth itself as a "value orientation." Rather, for him, the search for truth is a basic methodological assumption of science that should exist independently of individual preferences. Accordingly, the value of truth is translated into imperatives of intersubjective verifiability of statements, avoidance of value judgements, citation of sources, etc. (Goddard, 1973, p. 16).

irrespective of its potential application in practise or its societal relevance (Gethmann et al., 2015, chapter 2, pp. 9–10).

Yet, the objectivity of scientific research does not solely depend on the objectivity of the researcher. To the contrary, the selection of research topics, early immersion in the empirical material, and the formulation of initial hypotheses are inevitably informed and influenced by subjective ideas, interests and values. Thus, the application of scientific rigour and methodological proficiency is contingent upon the conduction of conceptualisation, theorisation and empirical analyses (Weber 1904/1988, pp. 512, 531–532).[4] The epistemic status of scientifically generated knowledge is contingent upon the research process itself. Again, whilst scientists and non-social scientists alike are influenced by socially constructed knowledge (e.g., everyday background assumptions in the form of social interpretations), scientific knowledge is epistemologically hardened by methodologically underpinned procedures (i.e., an established canon of methods) and by institutional protection from the outside (university education but also regulated publication procedures). This procedure enables the production of provisional truths that are susceptible to falsification (Mevissen, 2016, p. 197).

TDR challenges the conventional (though idealised) understanding of basic research and therefore continues to face considerable scepticism (Pohl & Hirsch Hadorn, 2008; Jahn et al., 2012; Osborne, 2015; Jaeger & Scheringer, 2018). In contrast to traditional conceptualisations of scientific research as outlined above, TDR prioritises conducting research on societal issues over genuine scientific problems or research gaps. Furthermore, it incorporates societal actors within the research process, enabling the generation of knowledge that is both application-oriented and solution-oriented with regard to the societal problem under investigation. These two aspects compel researchers to engage directly in normatively charged contexts, situating their scientific and methodological expertise within them. Hence, they are confronted with the task of navigating diverging (and oftentimes conflicting) societal values and interests regarding what ought to be done, as well as practical constraints regarding what can be done—from a scientific point of view. TDR must navigate the tension between "objectivity" (i.e., describing "what is") and normativity (i.e., advising on "what should be") (Gethmann et al., 2015, chapter 2, p. 18). This tension becomes most evident when normative interests, expectations and demands on sciences' performance and problem-solving ability come into conflict with the systemic properties and epistemic necessities of scientific methodologies (Lang et al., 2012, p. 26).[5]

4 To dismiss such a distinction and instead argue that scientific research was "never pure" and is always conflated with normative values (Gethmann et al., 2015, chapter 2, p. 9) is a somewhat indiscriminate conclusion.

5 The question to what extent researchers can intervene into societal discourse in general or policymaking procedures specifically are of course not unique to transdisciplinarity. There is a

While this also applies to (inter)disciplinary research to some extent, these questions are of greater significance in the context of TDR. This is because the endeavour to diminish the impact of individual norms and values on knowledge production becomes even more challenging when researchers intervene in social or political processes. This is particularly problematic when normative and epistemic arguments are inextricably linked. One particularly fraught example is the appropriation of scientific knowledge for the advancement of specific economic and/or political interests. The concern is that, when researchers form more intentional collaborations with societal actors, their interests become dominant, influencing the research agenda and thereby compromising scientific rigour in favour of outcomes and results preferred by (participating) societal actors (Gethmann et al., 2015, chapter 2, p. 10). Consequently, the integration of disparate bodies of knowledge in a productive and synergistic manner whilst preserving scientific rigour is the crux of TDR (Pohl & Hirsch Hadorn, 2008, pp. 114–115; Pohl et al., 2021, p. 21).

In view of the inherent philosophical challenge associated with TDR, this article will now present an interventionist understanding of TDR. This approach is based on Teun Zuiderent-Jerak's (2015) conceptualisation of interventionist social sciences. This constitutes a distinct approach to application-oriented research that would enable participants (scientists and societal actors alike) to address and research societal problems and to produce research-based, application-oriented knowledge. Although his work on interventionist social sciences does not explicitly mention TDR, this article aims to develop an understanding of TDR as a tool for conducting situated interventions. Zuiderent-Jerak's approach is of significant value to the discourse on TDR, as it offers invaluable insights into the role and responsibilities of a researcher investigating and intervening in normatively complex societal issues.

Interventionist Understanding of Transdisciplinary Research

In interventionist social sciences, the intervention is situated within the normative complexities related to the shared object of interest (i.e. a specific societal problem). Normative complexities encompass the empirically verifiable, object-related interests and values held by the participating societal

vast array of literature regarding the potentials, forms and limitations of political counselling on behalf of scientists (most notably here is the book *Honest Broker* by Roger Pielke (2007)) as well as technology assessment research and institutes, which, interestingly enough, currently turn to issues of socio-engineering transformation through transdisciplinary research methods as well (Grunwald, 2018; Böschen et al., 2021, p. 20; Di Giulio & Defila 2024). Similarly, Science and Technology Studies (STS) are also discussing transdisciplinary STS research formats under the term "making & doing" (Downey & Zuiderent-Jerak 2021).

and scientific actors. Throughout the research project, the goal is to collectively disclose, discuss and reflect upon these multitudes of value interpretations. Therefore, personal values in relation to enhancing the "common good" (which are often referred to when justifying transdisciplinary research) are not regarded as a rationale or justification for scientific research and intervention. In contrast, the focus of empirical research shifts to the examination of heterogeneous values, belief systems, and political objectives that are prevalent within society. The interventions are thus situated within a complex normative landscape that can be discussed, interpreted sociologically, and reflected upon (Zuiderent-Jerak, 2015, chapter 1, pp. 22–23). Following this line of argumentation, TDR in the sense of a situated intervention is carried out through the provision of an inclusive space for discourse and reflection. Throughout the research process, an interdisciplinary group of scientists frequently come together with societal actors to exchange their knowledge, interests, and perspectives on distinct topics related to the shared research object at hand. The transdisciplinary setting thus provides a forum for the collective exchange of arguments, observations, and experiences, thereby enabling participants to discern and contemplate the commonalities and divergences among their respective interests and perspectives on the subject.

The role of the scientists is to facilitate an integrative discourse space and discourse framework (e.g., through process management, moderation, and even mediation), to provide a platform for individual actors' thought structures and to observe and reflect on their exchange. Specifically, they can examine truth claims, provide factual knowledge, and process factual questions from the discourse in accordance with scientific standards. Furthermore, they are able to provide methodological expertise and guidance on reflection processes (Zuiderent-Jerak, 2015, chapter 1, pp. 27–30). It is imperative that such settings facilitate the recognition and integration of heterogeneous bodies of knowledge that reflect the diversity of perspectives on complex societal problems or objectives. This can be achieved by fostering an understanding of the respective values and interests, which are undoubtedly distinct and potentially conflict. By facilitating reflexive self-assurance regarding the consequences of various approaches to distinct social issues, scientists can assist societal actors in attaining clarity. TDR is therefore antithetical to the mere application or implementation of scientific knowledge. Instead, dialogical processes of revealing and reflecting on different realities should lead to a softening of entrenched beliefs, behaviours, rules or patterns. This ought to enable the participants to obtain a "more realistic" picture of the practice they are helping to promote (Jahr et al., 2024, pp. 298–299).

Joint reflection activities on differences in concepts of problems, goals, and actions facilitate mutual learning processes and knowledge integration, thereby providing unique empirical insights on specific societal issues as well. In particular, as demonstrated by Marg and Theiler (2023) in their exploratory

empirical study, TDR has the potential to alter the comprehension of scientific issues (enlarging, modifying or refining the research subject and/or problem definition). Moreover, it has the potential to enhance the quality of scientific knowledge, both in terms of methodological innovations and improvements in data and knowledge generation processes. Additionally, it can foster reflexivity at the personal level and in relation to disciplinary perspectives and methods (p. 642). All in all, TDR as situated intervention is neither a theory nor a methodology. Instead, it constitutes an innovative research approach for generating interpretations of the social world and producing salient analyses without the necessity of scientists assuming the role of political activists (Zuiderent-Jerak, 2015, chapter 1, pp. 10, 23).

This abstract conceptualisation of TDR as a situated intervention will be illustrated by an empirical example. The following section will introduce a transdisciplinary real-world laboratory, which addresses the political objective of enhancing citizen participation in Bremen—a city-state in north-western Germany. It yielded practical insights into the normative complexities (heterogeneous values, belief systems, and political objectives held by participating societal actors) that became evident when discussing citizen participation. This in turn allowed for the production of research-based, application-oriented knowledge on local participation producers as well as valuable scientific insights on citizen participation and science-society interactions.

Case Study: A Transdisciplinary Real-World Laboratory on Citizen Participation

The research project "Wissen-schafft-Politik" ("Knowledge-creates-politics"), conducted at the German Research Institute Social Cohesion (RISC), examined the interrelationship between social sciences and politics on the topic of social cohesion. In order to gain empirical insights into the dynamics of knowledge exchange processes between science and society, the research team initiated a transdisciplinary real-world laboratory (RWL) in 2021. The reference to the "real-world" reflects the premise of having societal problems as starting points with the intention of intervening in them (Wanner et al., 2018, p. 101). The term "laboratory" illustrates the "promise of combining the value of concrete action paired with scientific rigour and persuasiveness" (Wanner et al., 2018, p. 95). The term "real-world laboratory" is often linked with transdisciplinary research yet is not used exclusively in that domain (as it also occurs in interventionist or participatory action research or transition management) (Beecroft & Parodi, 2016, p. 5–6; Kofler, 2023, p. 3; for a thorough discussion of the term see: Parodi et al., 2023). Key dimensions of "real-world laboratories" are the varying levels and intensities of participation of societal actors (Meyer-Soylu et al., 2016). In that regard, and given co-creative forms of

participation, transdisciplinary research formats are often described as "real-world laboratories" (Wanner et al., 2018; Beecroft & Parodi, 2016; Kofler, 2023).

To identify suitable subjects of interest and participants for this particular real-world laboratory, a series of seventeen interviews were conducted with municipal actors representing various sectors, including politics, administration, the media, and civil society in the city of Bremen. The objective was to gain insight into their perspectives on the challenges, priorities, and opportunities for action related to the topic of social cohesion. In these exploratory interviews, the subject of augmented citizen involvement through deliberative formats of citizen involvement in political decision-making processes (e.g., citizen councils) was repeatedly referenced by the interviewees when discussing the state of social cohesion. The disparate conceptualizations of "good" citizen participation informed the normative expectations for bolstering or maintaining social cohesion. In addition to these explorations, Bremen's government at that time (legislative period: 2019–2023) included the political objective of "modernising" the political-institutional participation structure in order to facilitate "improved" citizen involvement in political decision-making processes in its coalition agreement. This agreement was based on existing guidelines and political resolutions on the expansion and modernisation of citizen participation in the city that had already been adopted in previous legislative periods. This indicated a convergence between the tangible local political process and the research project's objective, within which the real-world laboratory could be situated.

Starting in early 2021, the research project initiated the transdisciplinary real-world laboratory "Knowledge-creates-politics." The objective was to facilitate dialogue and collaboration on strategies to enhance the opportunities for deliberative citizen participation in Bremen. To that end, the research project initiated, organised and conducted a series of three workshops, which included a diverse group of actors, who play or should play an active role in the policymaking process. This included non-certified experts and practitioners (members of local district parliaments and offices, of the parliamentary committee of the Bremen Parliament responsible for citizen participation, and of the Senate Chancellery) as well as civil society organisations (the Bremen Civil Society Network for Citizen Participation and the Association of Citizens' Initiatives in Bremen). The workshops had around 30 participants. In addition, the research team invited the social actors to regular meetings to jointly facilitate the design, preparation, monitoring, evaluation, and review of each workshop. About ten social actors participated in these regular meetings.

The workshop series functioned as transdisciplinary platforms for discourse and reflection, providing an integrative setting for the exchange of diverse bodies of knowledge, interests, and perspectives on distinct topics related to citizen participation in Bremen. The workshops were conducted over a one-year period, during which participants convened to deliberate on

pivotal elements and milestones in the implementation of enhanced opportunities for citizen participation. From a scientific standpoint, the normative complexities pertaining to the issue of citizen participation, as observed among the societal actors (i.e., the disparate perspectives, expectations, and competing objectives) (section 3.1.), as well as the assessment and evaluation of the real-world laboratory as a situated intervention (section 3.2.), were of significant interest.

Normative Complexity and Knowledge Integration

Throughout the workshop-series, the efforts to expand existing citizen participation moved towards intervening in established power constellations and routines of municipal political processes, which, unsurprisingly, encountered resistance and reservations on the side of local administration and political parties. Whilst the overarching objective was included in the coalition agreement and endorsed by the societal actors involved (albeit to varying degrees), there was considerable heterogeneity in the intentions of its implementation and thus the intended effects of the participation processes. Hence, one of the most significant challenges was navigating the normative complexities in the real-world laboratory and thus the inherent contradictions between the various political agendas and interests at play.

The expectations of civil society for greater transparency and participation in open-ended project planning frequently encountered opposition from political and administrative bodies, whose primary objective was the establishment of procedural regulations that were both effective and resource efficient. From the perspective of civil society, genuine involvement in decision-making processes was regarded as a fundamental tenet of democratic governance. This entails open dialogue, ongoing participation, and transparency, which were considered essential for ensuring that projects reflect the needs and values of the community. In contrast, political and administrative actors frequently prioritised the optimisation of resources and the streamlining of procedures to ensure that projects are implemented efficiently and with minimal disruption. For these actors, the challenge lay in striking a balance between the need for public input and the practical demands of governance. These demands included time constraints, budgetary limitations, and the need to maintain order, if not control over the process. This tension underscores the disparate normative complexities of the topic at hand. While civil society advocated for a more inclusive and deliberative process, political and administrative actors were motivated by the necessity to achieve clear, tangible outcomes within a defined set of constraints.

The issue of activating those population groups that are less visible in the established structures of representative democracy was, however, of significant importance to all participants. Accordingly, the second workshop was

dedicated to this issue and included a panel discussion with the affected civil society (e.g. advocacy groups and individuals, who work in close collaboration with marginalised groups). The panel discussion revealed that individuals from marginalised groups tend to have a profound and long-standing scepticism regarding the political process. This scepticism also extended to deliberative participation formats aimed at facilitating greater public involvement in decision-making processes. Despite their design for inclusivity, these formats were viewed with suspicion, likely because they were perceived as superficial or irrelevant to the interests and needs of marginalised groups. The primary concerns of this demographic are discrimination, adequate household income, secure employment, childcare options, enhanced and more readily accessible social support services and other related matters. The appeal of participating in deliberative decision-making procedures during their limited spare time is, at best, constrained. These transdisciplinary discussions thus highlighted, that achieving meaningful participation is not just about inviting marginalised groups to the table but also about addressing the deeper issues of trust, authenticity, and the real-life struggles they face.

All in all, the workshops provided an opportunity for participants to articulate and reflect on their perspectives, interests, and values, facilitating mutual learning and understanding. This led to a loosening of firmly held beliefs and reservations as the group was able to engage in collective reflection on the disparate interests and expectations pertaining to citizen participation. This enabled them to gain a more detailed and research-based understanding of the potential and barriers to local citizen participation. As a result of this process, the group was able to acknowledge the existence of differing perspectives as well as shared perspectives, overlapping interests and values on the matter. In close collaboration with the societal actors, the research team integrated these insights into a consensually agreed set of recommendations for action.

Societal and Scientific Outcomes

The recommendations for action were presented at a closing event that occurred four weeks prior to the local elections. In addition to the participants of the workshop series, the parliamentary group leaders of each parliamentary group (Christian Democrats (CDU), Social Democrats (SPD), Free Democratic Party (FDP), The Greens (Die Grünen), and The Left (Die Linke)) of the local parliament were invited to attend. The politicians, including those from the ruling parties who had previously agreed to incorporate enhanced citizen participation into the coalition agreement, voiced vehement objections not only to the proposed recommendations for action but also to the very idea of strengthening citizen participation. Instead, they underscored the necessity to reinforce existing structures, most notably the elected local district parliaments. In the course of the subsequent electoral process and coalition negotiations, a

new coalition agreement was reached, while the incumbent governing parties remained in power. The revised agreement no longer includes any provisions pertaining to enhanced participation structures. The stipulations set forth in the preceding coalition agreement have been rendered moot in the current political climate. In their place, the focus has been redirected towards reinforcing the existing representative participation formats, effectively concluding the prolonged discourse surrounding the viability of increased opportunities for citizen participation. It is not possible to ascertain the exact extent to which the real-world laboratory and its proposals, along with the subsequent political discussions influenced this decision.

It is conceivable that a more politically robust set of guidelines and recommendations could have been produced had the real-world laboratory been successful in including higher-ranking political actors. This illustrates that collaboration between politics and sciences is contingent upon the shifting priorities of day-to-day political operations, personnel changes, or regulatory alterations at the higher political level. (Similar points have been made by Lang et al. (2012, pp. 38–39) and Goven et al. (2015, p. 32).) In sum, this real-world laboratory demonstrates the difficulties associated with intervening in political issues and the normative complexities inherent in the production of applicable knowledge related to them. Whilst the project facilitated a forum for deliberation that would otherwise not have occurred, the resulting practical guidelines did not have the anticipated impact on policymaking. One might conclude that the RWL was therefore unsuccessful. In consideration of the interventionist perspective on transdisciplinary research, this paper proposes a more nuanced point of view.

As argued above, situated interventions do not seek to implement pre-formulated imperatives for action or normative objectives in a predetermined manner. In contrast, the generation of knowledge and a productive interplay between science and practice are the primary focus (Zuiderent-Jerak, 2015, pp. 23, 27). Linking the evaluation process too closely to the fulfilment of normative objectives carries the risk of making the scientific process vulnerable to non-scientific interests and political expediency, which would ultimately jeopardise the scientific independence of the project (Zuiderent-Jerak, 2015, pp. 28, 35; Jaeger & Scheringer, 2018, p. 346)

In terms of determining the scientific value of this real-world laboratory, the normative complexities displayed during the deliberations throughout the workshop series provided fruitful insights on the matter of citizen participation. Whilst most of the perspectives, interests and values displayed by the participating societal actors corroborate existing scientific research,[6]

6 The different normative and strategic expectancies towards citizen participations have been extensively documented in the scientific literature on citizen participation (e.g., Beierle & Cayford, 2002, Chapter 3; Irvin & Stansbury, 2004; Kübler et al., 2019; Schmidthuber et al., 2020; Fernández-Martínez et al., 2020).

it was quite interesting to notice that most participants framed citizen participation as primarily beneficial for marginalised groups, yet this normative sentiment was not shared by the participants representing such groups. Thus, while citizen participation is often regarded as a democratic innovation, it is frequently the already politically mobilised and socially dominant citizens who demand additional formats through which they can make their opinions be heard. From a sociological perspective, research should demonstrate greater differentiation in terms of normative participation claims (i.e., the actors who advocate for increased citizen participation), process design (i.e., the actors who are eligible to participate in the processes), and evaluation (i.e., the actors who benefit from participation) across different socio-economic milieus. Such an approach would facilitate the generation of more insightful findings regarding the democratic value added by deliberative citizen participation.

Concluding Remarks

Transdisciplinary research represents a distinct mode of inquiry, alongside disciplinarity and interdisciplinarity. Disciplinary and interdisciplinary research are primarily concerned with epistemological, methodological, or conceptual inquiries and are conducted within a controlled setting with a fixed set of methods and models. The majority of disciplinary research is discussed with other scholars from the same or similar discipline(s). Similarly, the objective of interdisciplinary research designs is to incorporate the input of scholars from disparate disciplines, who collaborate on a common research topic. The transdisciplinary approach, on the other hand, emphasises close collaborations with diverse societal actors, thereby allowing for a more integrated and responsive approach to knowledge generation.

TDR as a situated intervention enables the facilitation of integrative discourses among heterogeneous groups of participants on the subject of problem views, objectives, and options for action. The role of scientists is to adopt a primarily observational perspective and to utilise analytical tools to examine those social contexts, namely the structural prerequisites and consequences of action, which may not be readily apparent to the subjective view of the societal actors. The incorporation of scientific methods and findings, impartial moderation, and formal-logical discussions of values informed by scientific evidence should also facilitate the development of problem-solving approaches that are both scientifically based and applicable in practice. The disclosure, discussion, and reflection of potentially conflicting interests and values are thus of significant relevance to the procedures of knowledge integration and knowledge production. Accordingly, the dispute between and within the groups of participants must be acknowledged, reflected upon, and dealt with constructively..

This also presents the challenge of being confronted with societal actors who inevitably seek to utilise scientific expertise and/or individual scientists to advance their respective interests. Nevertheless, this interrelation between diagnosing and intervening amidst conflicting societal interests and normative values is precisely what situated interventions are about. Rather than making a pre-defined diagnosis of what the normative problem is and how it should be resolved, the "intervention is reflexively connected to the very production of this diagnosis; . . . intervention is about the production of proof about the practise" (Zuiderent-Jerak, 2015, chapter 1, p. 27). This, in turn, implies that the pursuit of (social or policy) change may ultimately yield outcomes that differ from those initially anticipated—the empirical case-study presented here illustrates this point. This aspect must be taken into account when assessing the impact of transdisciplinary RWL.

The concept of TDR as situated intervention offers valuable insights into the scope for sciences to contribute to societal problem-solving strategies without compromising the quality of scientific research. Consequently, a fundamental aspect of TDR as situated intervention is its status as a distinct research approach for the production of scientific knowledge, rather than a mere instrument for societal change. The emphasis on societal issues and the involvement of societal actors in the research process requires researchers to engage with non-scientific values and interests. These can and should inform the problem definition, shed light on the complexity of the issue(s) at hand and guide the selection of initial research questions and hypotheses throughout the project. The application of the scientific methodology and the empirical analysis, however, should be conducted in accordance with established scientific procedures and quality indicators. Otherwise, the knowledge produced would be devoid of epistemological value and the participating researchers would be more akin to well-informed political activists than to scientific experts (Zuiderent-Jerak, 2015, chapter 1, pp. 7, 19–20).

In this context, it is crucial to recognise that the value of scientific expertise lies not in determining political decisions, as they cannot be resolved in terms of truth or falsehood. Rather, such decisions are the result of political assessments of interests and values, as well as short- and long-term goals. While scientific knowledge and methods cannot determine the optimal political action, they can facilitate decision-making processes by convening a diverse group of societal actors and providing scientific expertise and methodological tools. This, in turn, can enable collaborative learning and reflection, enhance understanding of pertinent interests and potential courses of action, and yield new, application-oriented knowledge. In this regard, basic research may also benefit from inter- and transdisciplinary discourses, which can facilitate a more profound comprehension of the research subject and its societal context.

In conclusion, while scientific knowledge production cannot be the exclusive focus of TDR, it nevertheless remains a primary objective. This

understanding differs from existing literature in that it places greater emphasis on the scientific potential of TDR, which is often overlooked in favour of an exclusive focus on its practice-oriented aspect. This research gap is however receiving increasing attention (e.g., Hegger & Dieperink, 2015; Zscheischler et al., 2018; Jahn et al., 2022; Marg & Theiler, 2023). The aforementioned considerations collectively illustrate the necessity for a more nuanced approach to TDR, one that acknowledges the scientific potential inherent in this field while also recognising the importance of practice-oriented considerations. Nevertheless, it is imperative to further elucidate the manner in which to approach the potential trade-off between the scientific rigour and the social relevance of corresponding practices, not only at the theoretical level, but also in practice. In this regard, it is crucial to acknowledge and leverage the existing expertise in knowledge exchange and integration processes as outlined in interdisciplinary research studies (e.g., Boix Mansilla et al., 2016; Keestra, 2017; Bammer et al., 2020). Both interdisciplinary and transdisciplinary approaches are gaining prominence within the scientific community. The numerous interdisciplinary evaluations of transdisciplinary real-world laboratories will facilitate the identification of appropriate methodological tools and best practices. In light of these developments, it seems prudent to view transdisciplinary processes of knowledge exchange and integration as a topic worthy of further interdisciplinary observation and research.

Biographical Note

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References

Bammer, G., O'Rourke, M., O'Connell, D., Neuhauser, L., Midgley, G., Klein, J.T., Grigg, N.J., Gadlin, H., Elsum, I.R., Bursztyn, M., Fulton, E.A., Pohl, C., Smithson, M., Vilsmaier, U., Bergmann, M., Jaeger, J., Merkx, F., Vienni Baptista, B., Burgman, M.A., Walker, D.H., . . . Richardson, G.P. (2020).

Expertise in research integration and implementation for tackling complex problems: when is it needed, where can it be found and how can it be strengthened? *Palgrave Communications*, *6*(1), 1–16. https://doi.org/10.1057/s41599-019-0380-0

Beecroft, R., & Parodi, O. (2016). Reallabore als Orte der Nachhaltigkeitsforschung und Transformation. *Technikfolgenabschätzung—Theorie und Praxis*, *25*(3), 4–8. https://doi.org/10.14512/tatup.25.3.4

Beierle, T. C., & Cayford, J. (2002). *Democracy in practice: Public participation in environmental decisions*. RFF Press. https://doi.org/10.4324/9781936331017

Bergmann, M., Jahn, T., Knobloch, J., Krohn, W., Pohl, C. & Schramm, E. (2012). *Methods for transdisciplinary research. A primer for practice*. Campus.

Boix Mansilla, V., Lamont, M., & Sato, K. (2016). Shared cognitive-emotional-interactional platforms: Markers and conditions for successful interdisciplinary collaborations. *Science, Technology, & Human Values*, *41*(4), 571–612. https://doi.org/10.1177/0162243915614103

Böschen, S., Grundwald, A., Krings, B., & Rösch, C. (2021). Technikfolgenabschätzung—neue Zeiten, neue Aufgaben. In S. Böschen, A. Grundwald, B. Krings & C. Rösch (Eds.), *Technikfolgenabschätzung. Handbuch für Wissenschaft und Praxis* (pp. 15–42). Nomos.

Collins, H. M., & Evans, R. (2002). The third wave of science studies: Studies of expertise and experience. *Social Studies of Science*, *32*(2), 235–296. https://doi.org/10.1177/0306312702032002003

Defila, R. & Di Giulio, A. (2018). Partizipative Wissenserzeugung und Wissenschaftlichkeit—ein methodologischer Beitrag. In R. Defila & A. Di Giulio (Eds.), *Transdisziplinär und transformativ forschen: Eine Methodensammlung, Band 1* (pp. 39–67). Springer.

Di Giulio, A., & Defila, R. (2024). Technology assessment as transdisciplinary research. In A. Grunwald (Ed.), *Handbook of technology assessment* (pp. 354–364). Edward Elgar Publishing.

Downey, G., & Zuiderent-Jerak, T. (Eds.). (2021). *Making & doing: Activating STS through knowledge expression and travel*. MIT Press.

Fernández-Martínez, J. L., García-Espín, P., & Jiménez-Sánchez, M. (2020). Participatory frustration: The unintended cultural effect of local democratic innovations. *Administration & Society*, *52*(5), 718–748. https://doi.org/10.1177/0095399719833628

Gethmann, C. F., Carrier, M., Hanekamp, G., Kaiser, M., Kamp, G., Lingner, S., Quante, M., & Thiele, F. (2015). *Interdisciplinary research and transdisciplinary validity claims*. Springer.

Goddard, D. (1973). Max Weber and the objectivity of social science. *History and Theory*, *12*(1), 1–22. https://doi.org/10.2307/2504691

Goven, J., Langer, L., Baker, V., Ataria, J., & Leckie, A. (2015). A transdisciplinary approach to local waste management in New Zealand: Addressing interrelated challenges through indigenous partnership. *Futures*, 73, 22–36. http://dx.doi.org/10.1016/j.futures.2015.07.011

Grunwald, A. (2018). A transdisciplinary approach to the process of socio-technical transformation: The case of German Energiewende. In M. Padmanabhan (Ed.), *Transdisciplinary Research and Sustainability* (pp. 35–52). Routledge.

Hansson, S., & Polk, M. (2018). Assessing the impact of transdisciplinary research: The usefulness of relevance, credibility, and legitimacy for understanding the link between process and impact. *Research Evaluation*, *27*, 132–44. https://doi.org/10.1093/reseval/rvy004

Hegger, D., & C. Dieperink. (2015). Joint knowledge production for climate change adaptation: What is in it for science? *Ecology and Society*, *20*(4). http://dx.doi.org/10.5751/ES-07929-200401

Irvin, R. A,. & Stansbury, J. (2004). Citizen participation in decision making: Is it worth the effort? *Public Administration Review*, *64*, 55–65. https://doi.org/10.1111/j.1540-6210.2004.00346.x

Jaeger, J., & Scheringer, M. (2018). Why is stakeholder involvement not essential to transdisciplinary research? *GAIA*, *27*(4), 345–347. https://doi.org/10.14512/gaia.27.4.4

Jahn, S., Newig, J., Lang, D. J., Kahle, J., & Bergmann, M. (2022). Demarcating transdisciplinary research in sustainability science—Five clusters of research modes based on evidence from 59 research projects. *Sustainable Development*, *30*(2), 343–357. https://doi.org/10.1002/sd.2278

Jahn, T., Bergmann, M., & Keil, F. (2012). Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics*, *79*, 1–10. https://doi.org/10.1016/j.ecolecon.2012.04.017

Jahr, D., Arend, A., & Backhaus–Maul, H. (2024). Wissenstransfer zwischen zivilgesellschaftlichen Bildungsakteur:innen und Sozialwissenschaftler: Innen—Dokumentarische Analysen eines Fachgesprächs über Service–Learning–Praxis. In H. Backhaus–Maul, S. Fücker, M. Grimmig, V. Kamuf, J. Nuske, M. Quent (Eds.), *Forschungsbasierter Wissenstransfer und gesellschaftlicher Zusammenhalt. Theorie, Empirie, Konzepte und Instrumente* (pp. 273–302). Campus.

Jantsch, E. (1970). Inter- and transdisciplinary university: A systems approach to education and innovation. *Policy Sciences*, *1*, 403–428. https://doi.org/10.1007/BF00145222

Kaldewey, D. (2018). The grand challenges discourse: Transforming identity work in science and science policy. *Minerva*, *56*, 161–182. https://doi.org/10.1007/s11024–017–9332–2

Keestra, M. (2017). Metacognition and reflection by interdisciplinary experts: Insights from cognitive science and philosophy. *Issues in Interdisciplinary Studies*, *35*, 121–169.

Klein, J. T. (2021). Alliances for interdisciplinarity and transdisciplinarity: A call for response. *Issues in Interdisciplinary Studies*, *39*, 7–35.

Kofler, I. (2023). Beyond disciplinary constraints: Designing transdisciplinary research and collaboration in real-world laboratories. *Societies*, *13*(9), 1–18. https://doi.org/10.3390/soc13090205

Krohn, W., Grunwald, A., & Ukowitz, M. (2017). Transdisziplinäre Forschung revisited. Erkenntnisinteresse, Forschungsgegenstände, Wissensform und Methodologie. *GAIA 26*(4), 341–347. https://doi.org/10.14512/gaia.26.4.11

Kübler, D., Rochat, P., Woo, S. Y., & van der Heiden, N. (2019). Strengthen governability rather than deepen democracy. Why local governments introduce participatory governance. *International Review of Administrative Sciences*, *86*(3), 409–426. https://doi.org/10.1177/0020852318801508

Lang, D. J., Wiek, A. & Bergmann, M. (2012). Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science*, *7*(1), 25–43. https://doi.org/10.1007/s11625-011-0149-x

Lawrence, M. G., Williams, S., Nanz, P., & Renn, O. (2022). Characteristics, potentials, and challenges of transdisciplinary research. *One Earth*, *5*(1), 44–61. https://doi.org/10.1016/j.oneear.2021.12.010

Marg, O., & Theiler, L. (2023). Effects of transdisciplinary research on scientific knowledge and reflexivity. *Research Evaluation*, *32*(4), 635–647. https://doi.org/10.1093/reseval/rvad033

Max-Neef, M. A. (2005). Foundations of transdisciplinarity. *Ecological Economics*, *53*(1), 5–16. https://doi.org/10.1016/j.ecolecon.2005.01.014

McGregor, S. L. (2018). Philosophical underpinnings of the transdisciplinary research methodology. *Transdisciplinary Journal of Engineering & Science*, *9*, 182–198. https://doi.org/10.22545/2018/00109

Meyer-Soylu, S., Parodi, O., Trenks, H., & Seebacher, A. (2016). Das Reallabor als Partizipationskontinuum: Erfahrungen aus dem Quartier Zukunft und Reallabor 131 in Karlsruhe. *TATuP-Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis*, *25*(3), 31–40. https://doi.org/10.14512/tatup.25.3.31

Mittelstraß, J. (1992). Auf dem Wege zur Transdisziplinarität. *GAIA*, *1*(5), 250.

Mittelstraß, J. (2018). Forschung und Gesellschaft. Von theoretischer und praktischer Transdisziplinarität. *GAIA*, *27*(2), 201–204. https://doi.org/10.14512/gaia.27.2.4

Nicolescu, B. (2002). *Manifesto of transdisciplinarity*. State University of New York Press.

Osborne, P. (2015). Problematizing disciplinarily, transdisciplinary problematics. *Theory Culture & Society*, *32*(5–6), 3–35. https://doi.org/10.1177/0263276415592245

Pärli, R. (2023). How input, process, and institutional factors influence the effects of transdisciplinary research projects. *Environmental Science & Policy*, *140*, 80–92. https://doi.org/10.1016/j.envsci.2022.11.019

Parodi, O., Steglich, A., & Bylund, J. (2023). Real-world lab. In P. Thorsten, & T.Schmohl (Eds.), *Handbook transdisciplinary learning* (pp. 287–296). Transcript. https://doi.org/10.14361/9783839463475

Piaget, J. (1972). The epistemology of interdisciplinary relationships. *Interdisciplinarity: Problems of teaching and research in universities*, 127–139.

Pielke, R. (2007). *The Honest broker: Making sense of science in policy and politics*. Cambridge University Press. https://doi.org/10.1017/CBO9780511818110

Pohl, C., & Hirsch Hadorn. G. (2008). Methodological challenges of transdisciplinary research. *Natures Sciences Sociétés*, *16*, 111–121. http://dx.doi.org/10.1051/nss:2008035

Pohl, C., Klein, J. T., Hoffmann, S., Mitchell, C., & Fam, D. (2021). Conceptualising transdisciplinary integration as a multidimensional interactive process. *Environmental Science & Policy*, *118*, 18–26. https://doi.org/10.1016/j.envsci.2020.12.005

Schmidt, J. C. (2021). *Philosophy of interdisciplinarity: Studies in science, society and sustainability*. Routledge.

Schmidthuber, L., Ingrams, A., & Hilgers, D. (2020). Government openness and public trust: The mediating role of democratic capacity. *Public Administration Review*, *81*(1), 91–109. https://doi.org/10.1111/puar.13298

Sharlin, A. (1974). Max Weber and the origins of the idea of value-free social science. *European Journal of Sociology*, 15(2), 337–353. https://doi.org/10.1017/S0003975600002964

Von Wehrden, H., Guimaraes, M. H., Bina, O., Varanda, M., Lang, D. J., John, B., Gralla, F., Alexander, D., Raines, D., White, A., & Lawrence, R. J. (2018). Interdisciplinary and transdisciplinary research: Finding the common ground of multi-faceted concepts. *Sustainability Science*, *14*, 875–888. https://doi.org/10.1007/s11625–018–0594–x

Wanner, M., Hilger, A., Westerkowski, J. Rose, M., Stelzer, F., & Schäpke, N. (2018). Towards a cyclical concept of real-world laboratories. *disP—The Planning Review*, *54*(2), 94–114. https://doi.org/10.1080/02513625.2018.1487651

Weber, M. (1988). Die »Objektivität« sozialwissenschaftlicher und sozialpolitischer Erkenntnis. In M. Weber, *Gesammelte Aufsätze zur Wissenschaftslehre* (pp. 146–214) (J. Wickelmann, Ed.). J.C.B. Mohr. (Original work published 1904)

Zscheischler, J., Rogga, S., & Lange, A. (2018). The success of transdisciplinary research for sustainable land use: Individual perceptions and assessments. *Sustainability Science*, *13*, 1061–1074. https://doi.org/10.1007/s11625-018-0556-3

Zuiderent-Jerak, T. (2015). *Situated intervention: Sociological experiments in health care*. MIT Press. https://doi.org/10.7551/mitpress/9780262029384.001.0001