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SWEET Call 1-2024

Support for Improved Implementation of Inter-/Transdisciplinarity in SWEET

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Support for Improved Implementation of Inter-/Transdisciplinarity in SWEET

1. The purpose and contents of this document

This document complements the SWEET call guideline and pre-proposal template regarding an improved implementation of interdisciplinary (ID) and transdisciplinary (TD) research in SWEET consortia.¹ Its purpose is to help consortia to develop and implement ID/TD research approaches. The document should stimulate meaningful reflection and systematic action within the extended consortium in preparation for submitting a pre-proposal to the SWEET programme.

Sections 2, 3 and 4 provide important background information on ID/TD research. Sections 5 and 6 contain information and resources on stakeholder analyses, expected outcome statements and integration concepts, which may provide advice and help you to implement your ID/TD research approach and prepare your pre-proposal.

Ensure that all digital and physical working documents created by your extended consortium during the preparation of the pre-proposal are kept in a dedicated place so that you can refine your ID/TD research approach during the preparation of the full proposal and update them regularly during the implementation phase of your extended consortium. The working documentation does not need to be polished and may include handwritten notes, workshop materials, graphical sketches and illustrations that have helped your extended consortium to develop and implement its ID/TD research approach. Your documentation will be useful for the workshop organised by td-net in the full proposal phase.

Other resources not directly related to pre-proposal preparation can be found in Section 7. If you would like to know more about td-net, please refer to Section 8.

2. Descriptions of inter-/transdisciplinary research

As stated in Section 1.1 of the call guideline, the purpose of SWEET is to fund ID/TD research and innovation activities with a focus on the goals of Switzerland's Energy Strategy 2050 and long-term climate strategy. The following provides brief descriptions of them as interpreted by the Swiss Federal Office of Energy (SFOE) in the context of the SWEET programme.²

To clarify the characteristics of ID and TD research, it is instructive to contrast them with multidisciplinary research. In multidisciplinary research, each discipline receives input from other disciplines, for example in the form of knowledge and data, but the discipline boundaries remain distinct. Moreover, each discipline retains its paradigms, nomenclature, knowledge, and methods and hence there is little to no lasting impact of the research on the disciplines. Multidisciplinary research is adequate for problems that can be solved by a single discipline but where the solution benefits from the input of other disciplines.

¹ Version of 12 March 2024, prepared for SWEET Call 1-2024.

² A comprehensive overview of definitions of TD may be found in Annex A1 of C. Pohl and G. Hirsch Hadorn, *Principles for Designing Transdisciplinary Research, Proposed by the Swiss Academies of Arts and Sciences*, oekom Verlag, Munich, Germany, 2007.

In ID research, the disciplines provide inputs to each other to solve a problem that could not be solved by one discipline by itself. Thus, although the discipline boundaries remain distinct, there is an integration of the disciplines. The integration enriches each discipline's paradigms, nomenclature, knowledge, and methods. The enrichment in turn leads to the development of new knowledge, methods, and tools, thereby having a lasting impact on the disciplines.

TD research may be viewed as a deeper and broader form of ID research. It is deeper because it transcends disciplines and thereby blurs discipline boundaries. It is broader because it includes not just scientists, but also stakeholders such as citizens and authorities, who should ideally participate in all phases of the research process. TD research represents a unified problem-solving approach in which problems are tackled not only from a disciplinary perspective but grappled with in their entire complexity. Therefore, TD research is necessary to solve problems that arise at the intersection of science and society or what is sometimes referred to as the "life-world".³ The outcomes of TD research cannot be assigned to a single discipline and include not just new knowledge and methods but also new paradigms.

TD research that tackles problems at the intersection of science and society may be thought of as research that generates not only systems knowledge (what is?), but also target knowledge (what are desirable target states?) and transformation knowledge (how to change?).⁴ Each discipline and stakeholder contributes to the three types of knowledge, depending on its methods, its approach to framing and formulating research questions, and its capacity to link abstract and context-specific knowledge. This heterogeneity of contributions is viewed as an asset in TD research, but also requires a respectful collaboration that begins with a joint framing of the problem.

3. The ideal transdisciplinary research process

This section describes the ideal TD research process (see Figure 1) as a systematised heuristic, divided into three phases: framing the problem, analysing the problem and exploring impacts. Figure 1 shows how the three phases are embedded in the application and evaluation phase and implementation phase of SWEET. Consortia should go through the three phases of the TD research process at least once during pre-proposal preparation and during full proposal preparation, and several times during implementation. Obviously, problem analysis and impact exploration are anticipatory and preparatory during the application and evaluation phases, compared to their reiterations during the implementation phase.

It is not always necessary to follow a particular sequence of phases. As ID/TD research is an iterative process, phases may overlap, be revised or occur in a different order. During the implementation phase of your extended consortium, for example, you may need to adapt your initial problem framing to new insights generated during problem analysis or the identification of unexpected side effects during impact exploration. The TD research activities that you are encouraged to undertake are outlined below according to the phases in which these activities are particularly formative.^{5,6}

³ See, e.g., G. Hirsch Hadorn, S. Biber-Klemm, W. Grossenbacher-Mansuy, C. Pohl, U. Wiesmann, and E. Zemp, The Emergence of Transdisciplinarity as a Form of Research, in: *Handbook of Transdisciplinary Research*, G. Hirsch Hadorn, H. Hoffmann-Riem, S. Biber-Klemm, W. Grossenbacher-Mansuy, D. Joye, C. Pohl, U. Wiesmann, and E. Zemp (eds.), Springer, 2008, pp. 19-39.

⁴ A description of the three types of knowledge may be found in C. Pohl and G. Hirsch Hadorn, *Principles for Designing Transdisciplinary Research, Proposed by the Swiss Academies of Arts and Sciences*. oekom Verlag, Munich, 2007, pp. 36-39.

⁵ See, e.g., D. J. Lang, A. Wiek, M. Bergmann, M. Stauffacher, P. Martens, P. Moll, M. Swilling, and C. J. Thomas (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>

⁶ See, e.g., C. Pohl, P. Krütli, and M. Stauffacher (2017). Ten Reflective Steps for Rendering Research Societally Relevant. *GAIA - Ecological Perspectives for Science and Society*, 26(1), 43-51. <https://doi.org/10.14512/gaia.26.1.10>

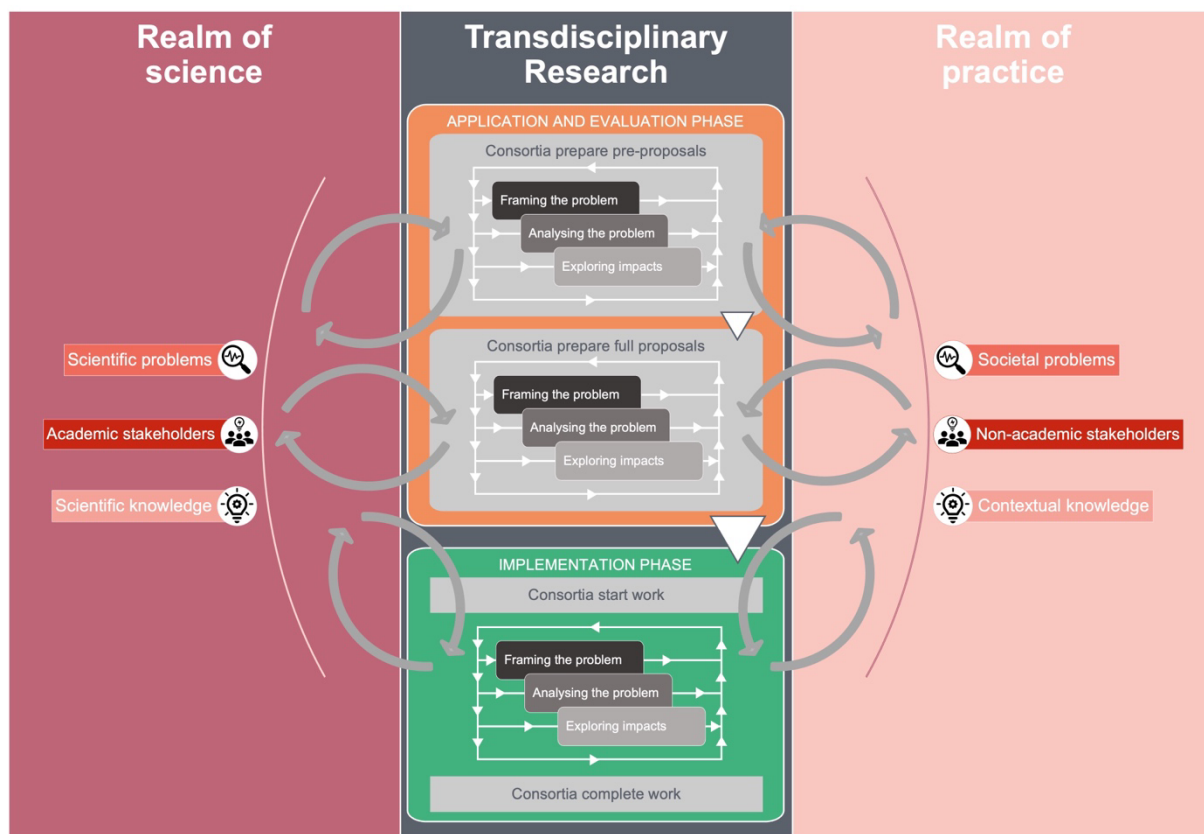


Figure 1: The ideal TD research process, embedded in the SWEET phases, where consortia dynamically engage stakeholders, problems and knowledge from science and practice.

3.1. Framing the problem

An ideal TD research process begins with joint problem framing with stakeholders and potential consortium members and collaboration partners. This phase is essential to ensure the relevance of the extended consortium you are building to a wide range of stakeholders and to address the complexity and diversity of potential problem understandings. Activities typically involve selecting relevant perspectives on a problem, integrating them into a common problem understanding, and jointly defining expected outcomes for solving the problem, including deciding on indicators to assess progress towards these outcomes. For each SWEET call, the guiding theme, the research challenges, and the requirements attached to the research challenges constrain the problem framing to a certain extent. Within those constraints, however, consortia are free to formulate expected outcomes and objectives and select approaches that are appropriate for the expected outcomes and objectives.

Refer to Section 5.2 and Resources [d] and [e] in Section 6 for assistance in reflecting on problem framing, which may also help you to develop and formulate the expected outcomes of your extended consortium for Section 3.1 (entitled "Expected outcomes") of the SWEET pre-proposal template.

It is essential that you involve your extended consortium's stakeholders in problem framing based on a preliminary stakeholder analysis, and that they are diverse enough to cover a variety of potential problem understandings that need to be integrated, and include representatives from science, private sector, politics and society.

Refer to Section 5.1 and Resources [a], [b] and [c] in Section 6 for assistance in analysing stakeholders, which may help you to conduct your stakeholder analysis for Section 2 (entitled "Preliminary stakeholder analysis") of the SWEET pre-proposal template.

3.2. Analysing the problem

In an ideal TD research process, it is not enough to jointly frame a problem, but it is equally important to know how to tackle the problem together. Given the diversity of perspectives and research practices, co-production and integration become imperative. The co-production of knowledge takes place between academic and non-academic consortium members and collaboration partners who carry out research together with academic and non-academic stakeholders.

Not all consortium members, collaboration partners and stakeholders need to be involved all the time in problem analysis. The level of involvement may vary from informing and consulting consortium members, collaboration partners and stakeholders to researching with them. Using your preliminary stakeholder analysis not only to map and prioritise stakeholders, but also to plan when and how to involve which stakeholders, can help you to create the conditions for successful integration and knowledge and technology transfer (KTT) activities.

Refer to Section 5.1 and Resources [a], [b] and [c] in Section 6 for assistance in analysing stakeholders, which may help you to conduct your stakeholder analysis for Section 2 (entitled "Preliminary stakeholder analysis") of the SWEET pre-proposal template.

Coordinating your extended consortium along an ideal TD research process requires management structures that create dedicated spaces for integration between academic and non-academic consortium members and collaboration partners. Therefore, ensure that extended consortium boards, meeting cycles and work programme activities include academic and non-academic representatives and that an appropriate balance of ID and TD expertise is achieved.

Dedicated integration spaces provide a common room for open encounters and constructive discussions between academic and non-academic members and partners, as well as for continuous reflection and adaption to the needs of your extended consortium. These spaces can range from formalised and structured interactions, such as periodic workshops and board meetings, to relatively open and loose formats in your extended consortium, such as jour fixe gatherings and regular lunchtime events, where people can share and reflect on their work activities and how they relate to each other without a fully prescribed agenda. But even in the latter case, these formats need to be consciously created and organised; they will not happen by themselves.

Meaningful integration can revolve around so-called boundary objects. Boundary objects bridge different perspectives and research practices and improve understanding across and beyond disciplinary boundaries, such as a common conceptual framework in your extended consortium, technological devices or new policies to be developed. It is necessary for a boundary object to be of interest and use to all consortium members and collaboration partners between whom integration occurs in a given context.

A practical example of a boundary object is a business strategy in the case of a company. If the strategy has understanding, applicability and meaning for the company's employees, and successfully bridges their different perspectives and practices, integration activities around the strategy are likely to result in a whole that is greater than the sum of its parts, which will benefit the implementation of the strategy.⁷ For consortia, carefully conducted problem framing activities during the SWEET application and evaluation phase can already inspire the first boundary objects.

Refer to Section 5.3 and Resources [j] and [k] in Section 6 for assistance in creating integration spaces and boundary objects, which may help you to develop and formulate your integration concept for Section 5.3 (entitled "Integration") of the SWEET pre-proposal template.

⁷ See, e.g., A. P. Spee and P. Jarzabkowski (2009). Strategy Tools as Boundary Objects. *Strategic Organization*, 7(2), 223-232. <https://doi.org/10.1177/1476127009102674>

3.3. Exploring impacts

Another phase in an ideal TD research process is to connect the outputs of your extended consortium to the “life-world” and explore how they might have impacts on stakeholders. Exploring impacts involves considering ways to achieve expected outcomes that are relevant to stakeholders by developing and testing ideas, actions and solutions with them based on co-produced knowledge. It is not the final phase of an ideal TD research process, but an iterative step through which potential weaknesses and unexpected side-effects of ideas, actions and solutions can be explored, and through which your problem analysis and framing can be adapted.

When considering expected outcomes for stakeholders, several factors come into play, including the valence (positive or negative), temporality (longevity and time to effect), intentionality (intended or unintended) and directness (direct or indirect) of impacts. Therefore, defining meaningful qualitative and quantitative indicators for assessing your progress toward expected outcomes is essential.⁸

Refer to Section 5.2 and Resources [f], [g], [h] and [i] in Section 6 for assistance in exploring impacts, which may help you to develop and formulate your extended consortium’s expected outcomes for Section 3.1 (entitled “Expected outcomes”) of the SWEET pre-proposal template.

4. Links and differentiations between inter-/transdisciplinary research with integration and knowledge and technology transfer

This section complements Section 3.2.4 (entitled “Key positions”) of the SWEET call guideline and links and differentiates between ID/TD research, integration and KTT.

Within an ideal TD research process, knowledge integration is an interactive process that combines a wide range of disciplinary perspectives (ID integration) and perspectives from science and consortium members and collaboration partners outside of academia (TD integration). This process involves linking and relating the different perspectives across cognitive, social and emotional dimensions to create an extended consortium that is more than the sum of its members and partners. Specific outcomes of the process may be novel concepts, methods, tools, and practices. Integration occurs contextually between two, several, or all consortium members and collaboration partners.^{9,10}

KTT is a necessary task to make the innovations developed by the extended consortium available to all target groups through appropriate channels, in particular to stakeholders from science, private sector, politics and society. By carefully pursuing a TD research approach, the extended consortium creates the “internal” conditions for successful KTT activities. For example, your stakeholder mapping for KTT should build on the (preliminary) stakeholder analysis that you periodically adapt as part of your TD research activities. The SWEET program deliberately emphasizes KTT to involve relevant stakeholders outside your extended consortium at an early stage to ensure that innovations are fully exploited and thus contribute to achieving Switzerland’s energy and climate policy goals.

⁸ An overview of different outcome and impact understandings may be found in B. Belcher and M. Palenberg (2018). Outcomes and Impacts of Development Interventions: Toward Conceptual Clarity. *American Journal of Evaluation*, 39(4), 478-495. <https://doi.org/10.1177/1098214018765698>

⁹ See, e.g., C. Pohl, J. T. Klein, S. Hoffmann, C. Mitchell, and D. Fam (2021). Conceptualising Transdisciplinary Integration as a Multidimensional Interactive Process. *Environmental Science and Policy*, 118(1), 18-26. <https://doi.org/10.1016/j.envsci.2020.12.005>

¹⁰ See, e.g., S. Hoffmann, L. Deutsch, J. T. Klein, and M. O'Rourke (2022). Integrate the Integrators! A Call for Establishing Academic Careers for Integration Experts. *Humanities and Social Sciences Communications*, 9(1), 1-10. <https://doi.org/10.1057/s41599-022-01138-z>

5. Suggested resources for inter-/transdisciplinary research methodologies

This section provides information on specific ID/TD research methodologies that you can use to prepare your pre-proposal, and for which various resources are provided in Section 6. Resources can be step-by-step guides for exchange and workshop formats in your extended consortium, or academic papers introducing methodologies to a scientific community. You are encouraged to try several resources and use those that work best for your extended consortium's pre-proposal preparation. You can combine methodologies that you find useful, both for formulating and visualising your inputs for the preliminary stakeholder analysis, ambition and collaboration sections of the pre-proposal template in particular, and for your ID/TD research approach in general.

The SFOE has developed a toolbox with 30 suggestions for measures that SWEET consortia may use to plan their KTT activities.¹¹ Selected suggestions are highlighted in this section, and their method cards can be found in the appendix of this document.

5.1. Preliminary stakeholder analysis

To help you to conduct a preliminary stakeholder analysis for Section 2 of the SWEET pre-proposal template, you are encouraged to explore Resources [a], [b], and [c] in Section 6 as well as Pages 13-14 in the appendix of this document.

Resource [a] provides a set of steps to create an overview of potentially relevant stakeholders for the SWEET call and your extended consortium. These steps can help you to preliminarily map and prioritise stakeholders from different perspectives, including their roles, expectations, interests and influence, based on the stakeholder mapping provided by the SWEET Office.

Resource [b] and Pages 13-14 allow you to build on the preliminary stakeholder analysis for the SWEET call and your extended consortium, by inspiring a rationale and procedure for involving stakeholders functionally (i.e., in relation to a specific objective of involvement) and dynamically (i.e., in relation to a specific type of involvement). Resource [b] provides you with a step-by-step guide for a collaborative activity in your extended consortium and a template for a diagram showing who needs to be involved, when, why and how. Resource [c] is an academic journal article proposing this rationale and procedure for approaching public participation in site selection processes for long-term nuclear waste disposal.

5.2. Expected outcomes

To help you to develop and formulate your extended consortium's expected outcomes for Section 3.1 of the SWEET pre-proposal template, you are encouraged to explore Resources [d], [e], [f], [g], [h] and [i] in Section 6 as well as Pages 15-20 in the appendix of this document.

Resource [d] is a blog post that provides concise information about joint problem framing and key challenges during the process, as well as a heuristic framework for reflecting on these challenges and improving upcoming process iterations. Together with Resource [e], an academic journal article that expands on the blog post, these resources can help you navigate the problem framing process, which involves setting boundaries for the problem understandings and expected outcome statements shared by your extended consortium.

Resource [f] and Pages 15-16 provide a framework that allows you to make explicit the expected outcomes of your extended consortium within the boundaries set during joint problem framing. Guided step-by-step through a collaborative activity with your extended consortium and, optionally, stakeholders selected on the basis of your preliminary analysis, you will collect,

¹¹ For further information, see <https://www.bfe.admin.ch/bfe/en/home/research-and-cleantech/funding-program-sweet/ktt-for-sweet.html>

formulate and make visible expected outcomes by classifying them using a conceptual map template. The mapping of expected outcomes provides a structured way to jointly evaluate which outcomes are preferred and fall within or outside your boundaries.

Resource [g] and Pages 17-18 support you in developing theories of change to which your extended consortium is contributing through its TD research activities. Model your extended consortium's theories of change in a workshop with stakeholders, for which Resource [g] provides a step-by-step guide and documentation templates and Resource [h] a short video. Resource [i] is an academic journal article on lessons learned from developing theories of change in a water and sanitation research programme at different levels, including project and programme levels.

Developing theories of change for your extended consortium will allow you to embed expected outcomes and objectives in a chain of impacts, from if and when the targets of the Energy Strategy 2050 and the long-term climate strategy (impacts targeted by the SWEET programme) will be achieved, to your specific research, innovation and KTT activities. There are currently no theories of change at the SWEET programme level. You are encouraged to work with the five-stage impact model briefly introduced in the footnote to Section 3.1 of the SWEET pre-proposal template to incorporate existing rationales and narratives of the programme.

If developed early for your extended consortium, theories of change can become useful reference points for planning and designing your extended consortium, including identifying meaningful qualitative and quantitative indicators, and for monitoring and evaluating implementation and progress toward the expected outcomes and impacts of the SWEET programme. Pages 19-20 provide inspiration on how to translate your theories of change into a roadmap for your extended consortium's work programme, visualising operational milestones on a timeline.

5.3. Integration

To help you to describe your integration concept for Section 5.3 of the SWEET pre-proposal template, you are encouraged to explore Resources [j] and [k] in Section 6 as well as Pages 21-22 in the appendix of this document.

Resource [j] and Pages 21-22 propose a structured and simple procedure to enable your extended consortium to create links between different research parts of your work programme. Resource [j] contains a workshop script centred around a matrix template, the completion of which during the workshop(s) will prepare integration spaces and activities by improving mutual understanding of different perspectives and practices and by preparing potential mutual contributions between research parts to a boundary object and, in the long term, to a larger whole in your extended consortium.

Resource [k] provides another structure for approaching knowledge integration in your extended consortium and inspires the creation of a diagram that can be used as a boundary object for detailing your integration concept in the upcoming consortium phases. This structure is translated into a collaborative activity in which you jointly explore the expertise available in your extended consortium in relation to common topics of interest. Similarly, consortium members and collaboration partners can be mapped to common themes, which can flesh out potential candidates for joint entry into dedicated integration spaces in the coming stages.

6. Resources

[a] T. Buser (n.d.). *Context and Actor Analysis*. Partnering for Change: Link Research to Societal Challenges. <https://tales.nmc.unibas.ch/en/partnering-for-change-link-research-to-societal-challenges-46/setting-up-a-transdisciplinary-research-project-240/context-and-actor-analysis-1418>

- [b] P. Krütli (2021). *Functional-Dynamic Stakeholder Involvement*. td-net Toolbox Profile (18). Swiss Academies of Arts and Sciences: td-net Toolbox for Co-Producing Knowledge.
<https://zenodo.org/records/4627081#.YHfp-S9XbBI>
- [c] P. Krütli, M. Stauffacher, T. Flüeler, and R. W. Scholz (2010). Functional-Dynamic Public Participation in Technological Decision-Making: Site Selection Processes of Nuclear Waste Repositories. *Journal of Risk Research*, 13(7), 861-875.
<https://doi.org/10.1080/13669871003703252>
- [d] B. Pearce and O. Ejderyan (2020). *A Heuristic Framework for Reflecting on Joint Problem Framing*. Integration and Implementation Insights.
<https://i2insights.org/2020/06/23/framework-for-problem-framing/>
- [e] B. Pearce and O. Ejderyan (2020). Joint Problem Framing as Reflexive Practice: Honing a Transdisciplinary Skill. *Sustainability Science*, 15(3), 683-698. <https://doi.org/10.1007/s11625-019-00744-2>
- [f] C. Mitchell and D. Fam (2020). *Outcome Spaces Framework*. td-net Toolbox Profile (9). Swiss Academies of Arts and Sciences: td-net Toolbox for Co-Producing Knowledge.
<https://zenodo.org/records/3717200#.Xs5tkC9Xb-Y>
- [g] B. Belcher and R. Claus (2020). *Theory of Change*. td-net Toolbox Profile (5). Swiss Academies of Arts and Sciences: td-net Toolbox for Co-Producing Knowledge.
<https://zenodo.org/records/3717451#.Xs5wtS9XbBI>
- [h] Monitoring, Evaluation & Learning Channel (2023). *Theory of Change*.
<https://www.youtube.com/watch?v=gYfSwXfVjw0>
- [i] L. Deutsch, B. Belcher, R. Claus, and S. Hoffmann (2021). Leading Inter- And Transdisciplinary Research: Lessons From Applying Theories of Change to a Strategic Research Program. *Environmental Science & Policy*, 120(1), 29-41. <https://doi.org/10.1016/j.envsci.2021.02.009>
- [j] M. Stauffacher (2021). *Give-And-Take Matrix*. td-net Toolbox Profile (16). Swiss Academies of Arts and Sciences: td-net Toolbox for Co-Producing Knowledge.
<https://zenodo.org/records/4627136#.YHfnzGhCTBI>
- [k] B. Pearce (2020). *Venn Diagram Tool*. td-net Toolbox Profile (6). Swiss Academies of Arts and Sciences: td-net Toolbox for Co-Producing Knowledge.
<https://zenodo.org/records/3717541#.Xs5zDC9XbBI>

7. Further resources

- [l] Australian National University (n.d.). *Integration and Implementation Sciences (i2S): Improving Research Impact on Complex Real-World Problems*. <https://i2s.anu.edu.au/>

Find a resource repository and an intellectual hub for conducting research on complex, real-world problems and tackling challenging societal and environmental issues in cross-disciplinary teams.

- [m] Hasso Plattner Institute of Design at Stanford University (2018). *Design Thinking Bootleg*.
<https://dschool.stanford.edu/resources/design-thinking-bootleg>

Here you will find a deck of design thinking tools, methods and concrete examples to inspire new ideas for possible ways of doing things.

- [n] SHAPE-ID (n.d.). *Pathways to Interdisciplinary and Transdisciplinary Research: the SHAPE-ID Toolkit*. <https://www.shapeidtoolkit.eu/>

Find tools and resources to make informed decisions about ID and TD research with the Arts, Humanities and Social Sciences, the Sciences, Technology, Engineering and Mathematics, and societal partners.

[o] Swiss Academies of Arts and Sciences (n.d.). *td-MOOC: Open Online Course on Transdisciplinary Research*. <https://transdisciplinarity.ch/en/kompetenzaufbau/tdmooc/>

Join a Massive Open Online Course (MOOC) on TD research as a living experience with a solid theoretical and methodological basis and five outstanding projects that illustrate promising different ways of dealing with complex societal challenges.

[p] Swiss Academies of Arts and Sciences (n.d.). *td-net Toolbox for Co-Producing Knowledge*. https://naturalsciences.ch/co-producing-knowledge-explained/methods/td-net_toolbox

Find methods and tools to jointly develop projects, conduct research and explore ways to impact in heterogeneous groups.

[q] Wageningen Research Centre for Development Innovation (2017). *The MSP Tool Guide: Sixty Tools to Facilitate Multi-Stakeholder Partnerships*. <https://mspguide.org/the-msp-tool-guide/>

Here you will find a collection of participatory tools for analysis, planning and decision-making that can be used as described or adapted to suit your purpose.

[r] Wageningen Research Centre for Development Innovation and Wageningen University and Research (2018). *Reflection Methods: Practical Guide for Trainers and Facilitators*. <https://mspguide.org/reflection-methods-practical-guide/>

This guide summarises methods that can be used to facilitate the process of reflection on the knowledge and experience people acquire during a learning process.

8. About td-net

The td-net¹² is a competence centre of the Swiss Academies of Arts and Sciences, which are organised as a non-profit association. Organisationally, td-net is integrated into the governance structures of the Swiss Academy of Sciences. In addition to the Swiss National Science Foundation, the Academies are a research funding institution for networking and dialogue according to the Federal Act on the Promotion of Research and Innovation. They carry out and promote the early identification of socially relevant topics in the fields of education, research and innovation, network the scientific community, are committed to the perception of ethical responsibility in research and teaching and shape the dialogue between science and society in order to promote mutual understanding.

Accordingly, td-net sees itself as a supporter of researchers and as a dialogue partner for research funders, administration and science policy. It is anchored in the National Institutions for Research and Innovation Promotion and works with other expert bodies at the interface between society, policy and science. The td-net has the explicit mandate to strengthen dialogue and early identification. It assumes this responsibility on behalf of the Swiss Confederation without representing any particular interests and works on a non-profit basis. Although the State Secretariat for Education, Research and Innovation contributes to the basic funding of td-net, it is dependent on third-party funding in order to be able to carry out target group-specific mandates for advisory, coaching or capacity building services.

For 20 years, td-net has been engaged in capacity building for TD research, drawing on experience, professionalisation efforts and evaluation results from the community of practice of TD researchers – in Switzerland, from German-speaking countries (D-A-CH) and internationally. Due to its position as a university-independent body that does not solicit research funding itself, td-net succeeds in shaping and mediating the exchange of experience among TD researchers, in acting as an interface between researchers and research funders, and in promoting mutual learning.

¹² See <https://transdisciplinarity.ch/en>

Appendix

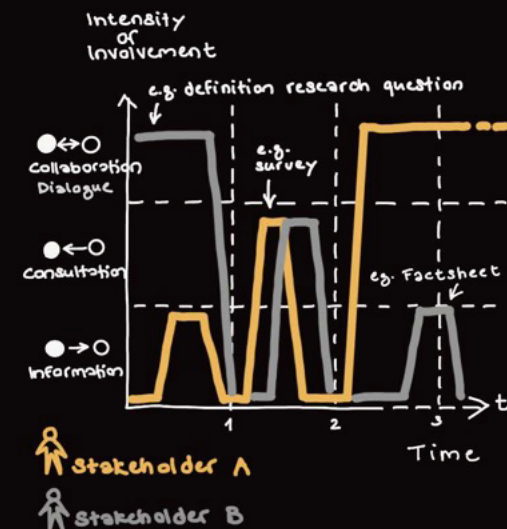
Selected Method Cards From the SWEET KTT Toolbox

Planning

Functional-dynamic Stakeholder Involvement

Whom to involve why,
when, and how?

- ↔○ Dialogue, Collaboration
- 👤👤👤 < 20
- 🕒 1-7 days
- 💰 < 500 CHF/yr
- 💡💡💡 Medium qualification



Functional-dynamic Stakeholder Involvement

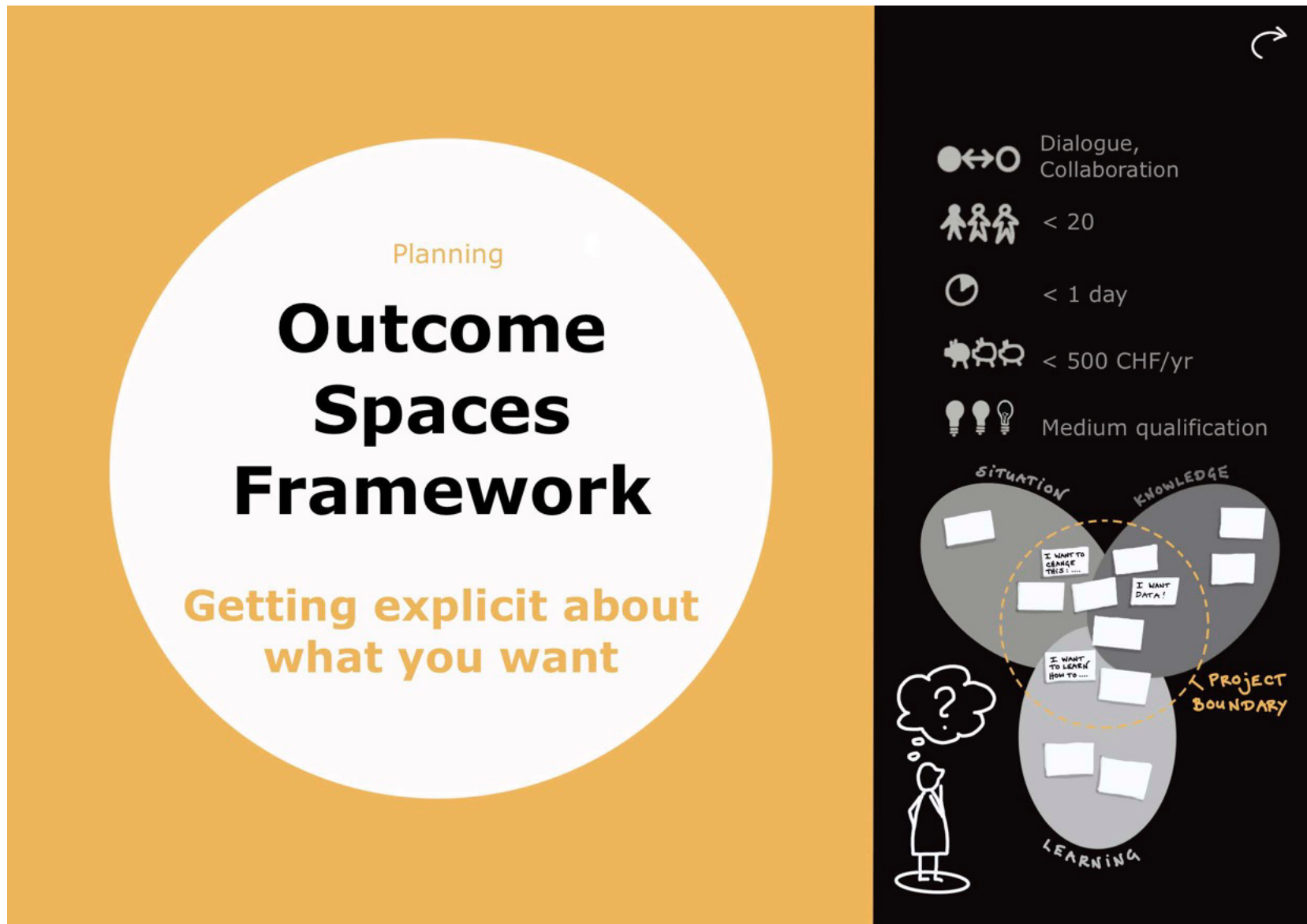
This tool helps research teams to get organized. Not all stakeholders need to be involved at the same level of intensity throughout the project. This planning tool helps to specify the *functional* involvement related to the goal of the project step, and the *dynamic* involvement related to the required involvement intensity (information, consultation, dialogue/collaboration). In other words: Who needs to be involved for what purpose, when, why, how and regarding what aspects.

The result is a diagram, similar to a fever curve, showing the involvement of different stakeholders along a time line. Different stakeholders may be involved in parallel at a certain point in time. Furthermore, there is a documentation of why (substantive, instrumental, normative, rationale), and for what aspects of the project, the respective stakeholders will be involved.

More: www.naturwissenschaften.ch > td-net Toolbox

Reflections
Reflections





Outcome Spaces Framework

This framework allows to reveal, categorise, articulate and evaluate the anticipated impact of a (research) project. It is perfect to make unspoken - even unconscious - expectations in a project team visible and to agree on what is feasible within the project implementation and what not. It takes min. 1-2 hours.

How does it work?

Step 1: Draw 3 large overlapping circles on a wall paper distinguishing between (i) improving the *situation* or field of inquiry, (ii) generating relevant stocks or flows of *knowledge*, and (iii) mutual and transformative *learning* by researchers and partners (or other appropriate categories).

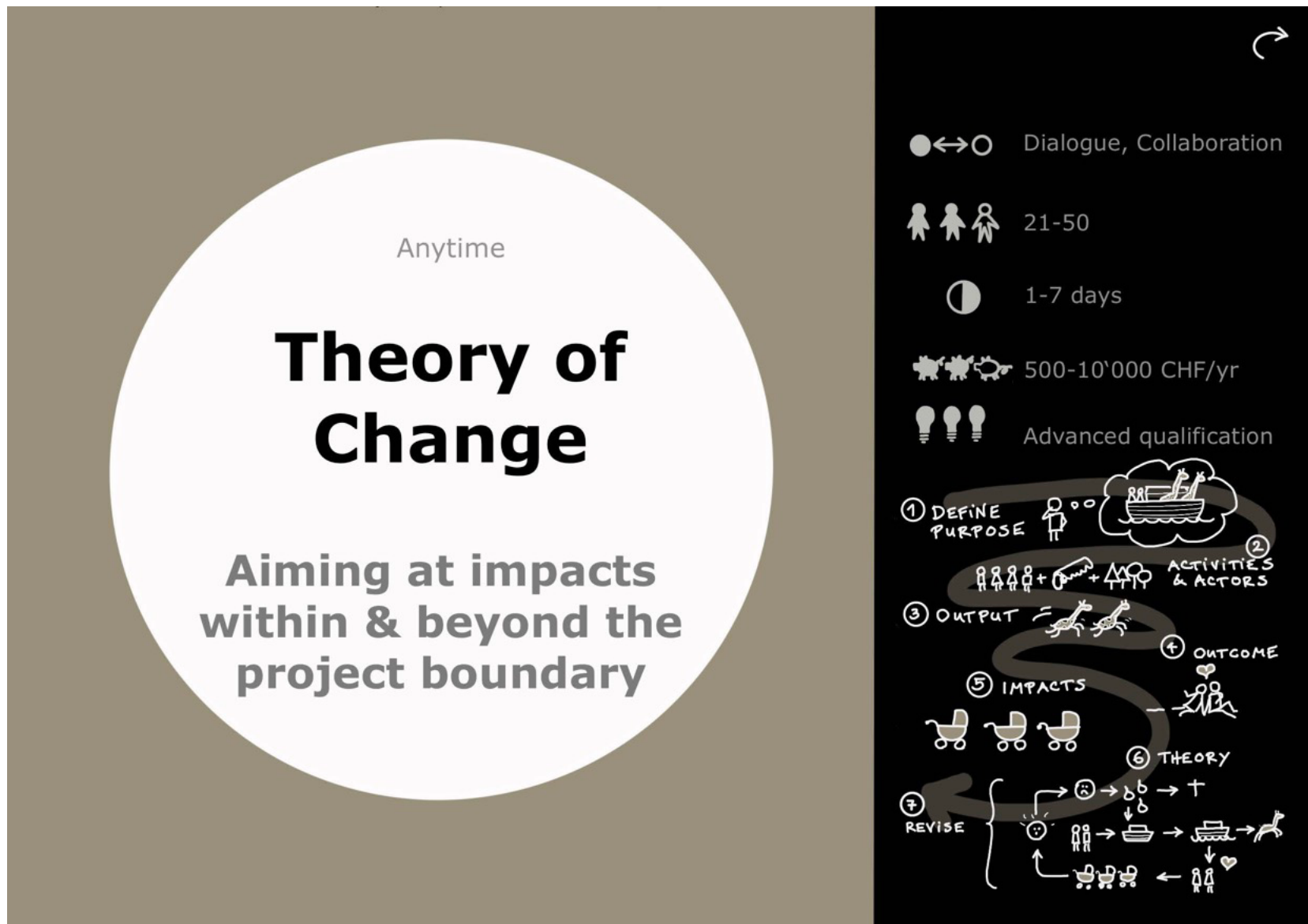
Step 2: Participants write their expectations on cards and stick them on the map.

Step 3: The moderator goes through each space inviting further explanations if necessary.

Step 4: The group discusses and decides for each expectation whether it falls inside or outside the project boundaries (additional circle in the center), and how in the next step these preferred outcomes might be incorporated into planning.

Reflections
Reflections





Theory of Change

If your (research) project aims at triggering change, this is the right tool for planning, monitoring, evaluating, or analysing the system you want to influence! The Theory of Change (ToC) is a model of a change process describing, for instance, how your project is expected to contribute to a process of change. The ToC is typically developed in a workshop setting with a facilitator, the program management, collaborators, and ideally stakeholders. The output is a narrative, table, or diagram.

How does it work?

Step 1: Define the overall purpose of your project, e.g. the transition to Net Zero.

Step 2: Identify main activities, actors involved, and engagement processes planned.

Step 3: Identify the outputs (e.g. knowledge, technology, relationships).

Step 4: Identify outcomes (e.g. effects on actors, such as changes in attitudes or behaviour).

Step 5: Identify impacts (e.g. tangible social, economic, environmental) influenced by the outcomes.

Step 6: Document/analyse underlying theories and assumptions about the main causal relationships.

Step 7: Revise and refine the model.

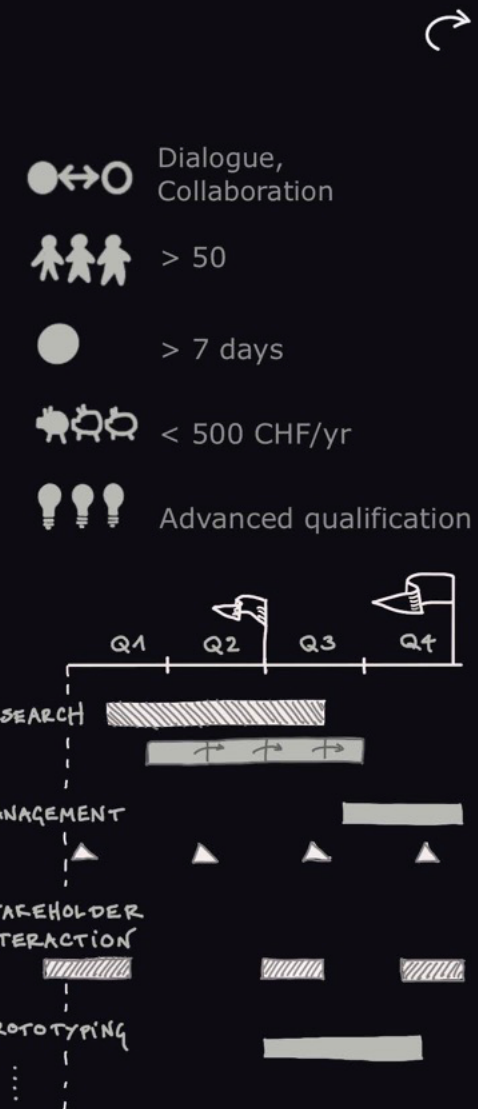
Reflections



Concept Development

Roadmap Development

A timeline of how a product or project evolves over time



Roadmap Development

A roadmap is a strategic plan that defines a goal or desired outcome, and includes the major steps or milestones needed to reach it. Ideally, it should be a product of collaboration and include the input of many stakeholders and cross-functional teams.

What are the essential pieces of a roadmap?

Timeline: You don't need to list specific dates. "Q1, Q2, Q3" or "March, April, May" will do it!

Goals: Setting goals or objectives is crucial to organize activities towards achieving them. This could be, for instance, the generation of new scientific findings, the development of a new technology, setting up a pilot & demonstration site, or achieving a fundamental system change.

Features: In science, these are often broadly labelled as Work Packages. You can create a hierarchy down to specific subfeatures (e.g. KTT, which should likely be an element of each Work Package).

Reflections





Give-and-Take-Matrix

The Give-and-Take-Matrix is a structured and simple process allowing diverse research teams to establish links between individual research parts or subprojects. It is ideally conducted in the project design or planning phase, and can be checked on a regular basis. This exercise can be done during a 2-3 hours workshop.

How does it work?

Step 1: Everybody writes down needs (the "take") into the diagonal fields of the matrix. This might be information, data, formats, contacts or products.

Step 2: Everybody checks these needs and adds possible support (the "give") in the other fields of the matrix. This is specific for each partner and can relate to any input or contribution.

Step 3: Jointly discuss needs and offers (the "takes" and "gives"). Agree on next steps, a time schedule, and possibly on certain rules.

Reflections
Reflections

