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## TRANSFORMATION TOOLBOX FOR THE INSTITUTIONALISATION OF TRANSDISCIPLINARITY AT THE ENHANCE UNIVERSITIES

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## // EXECUTIVE SUMMARY

Embedding transdisciplinarity as a research mode in the university practice of the ENHANCE Alliance is the primary focus of the working group FA1/WP3 'Sustainable development through transdisciplinary research'. It includes the development of approaches for a gradual institutionalisation of transdisciplinarity to permanently empower universities as drivers of sustainable development. Therefore, we followed three objectives: (1) to mainstream, optimize and provide structures for institutionalising the knowledge exchange between science and society by addressing structures, strategies and study cases/pilots within the Alliance, (2) to promote and enhance the international knowledge exchange between science and society within the Alliance, and (3) to foster a common understanding of the relevance and to encourage the transdisciplinary approaches of the ENHANCE universities as a way of solving wicked problems for sustainable development, including challenges and hindering factors.

This document contains recommendations for creating a supporting environment for this institutional transformation regarding a transformation toolbox for the institutionalisation of transdisciplinarity in the ENHANCE Alliance. Therefore, the seven initial partners (NTNU, Chalmers, TU Berlin, RWTH Aachen, WUT, POLIMI, UPV) generated an arena of institutional transformation through a systematically integrated process. Regarding the institutionalisation to be shaped, it fundamentally addresses two ENHANCE programme-specific dimensions: the creation of a common understanding of transdisciplinarity and the consideration of the diverse university approaches to transdisciplinary activities to generate productive synergy effects for a transformation to be realised within the Alliance. This integrates the different status of experiences, strategies and practices with transdisciplinarity. Furthermore, the different political framework conditions at the partner universities have been considered to enable a transdisciplinary approach in science. In addition to different academic cultures, university governance structures, strategic orientations, normative university strategies, funding conditions, cooperation, appointment strategies, and strategies for promoting early career researchers play an important role as challenging and facilitating factors.

Based on complex mapping activities, a common broad understanding of transdisciplinarity, the ENHANCE definition of transdisciplinarity, and a shared glossary as a living growing document (documented in <https://enhanceuniversity.eu/enhanceria/sustainable-development/>), we developed a concept of ENHANCE good practices. It includes key initiatives exemplifying elements of the potential for institutionalising transdisciplinary approaches for sustainable development projects, regarding creativity, innovation and linkages between strategic and project-based activities. This concept was also implemented to create a mutual learning environment among the ENHANCE universities and to address more real-life situations, including university governance and policies of the ENHANCE universities and integrating the challenges, barriers and triggers for creating a favourable institutional environment for the opportunities establishing long-term knowledge exchange between science and society. For developing the content for the transformation toolbox, we agreed on a broad understanding and scope of tools in two dimensions: first, generating joint working tools for the establishment of the ENHANCE mutual learning environment through designing an integrated process of knowledge exchange, and second, selecting possibly transferable tools from identified ENHANCE good practices. In total, the ENHANCE tools for the institutionalisation of transdisciplinarity refer to establishing and facilitating processes and products for the long-term knowledge exchange between research and society. The tools include conceptual ideas and experiences to transdisciplinary initiatives, methods and approaches in the form of various formats such as living labs and workshops, various newly created facilities and offerings such as the ENHANCE platform for transdisciplinarity, as well as jointly produced research results in the form of publications, reports and this transformation toolbox.

## //PART I INTRODUCTION

### 1. DEVELOPMENTS IN ENHANCERIA WP3 RESEARCH PERIOD

Within the framework of ENHANCERIA and the research and innovation dimensions of the ENHANCE Alliance, the focus area and work package FA1/WP3 ‘Sustainable development through transdisciplinary research’ focus on implementing transdisciplinarity in university practice. The institutionalisation and, thus, consolidation of the knowledge exchange between science and society aims to position transdisciplinary approaches as a research mode in the Alliance for solving major societal challenges in the long term.

During the three-year reporting period WP3, we identified, analysed and compared transdisciplinary initiatives at the ENHANCE universities regarding the research, teaching and strategic direction. Dealing with a broad scope of transdisciplinarity, this included the mapping of strategic structural facilities supporting transdisciplinary research for sustainable development and practices in terms of transdisciplinary research projects and pilots. Based on this, an advisory for a gradual institutionalisation of transdisciplinarity integrating the triggers and barriers for creating the right environment has been developed. Beyond this background, the following objectives have been followed:

- 1) to take into account the different status of experiences with transdisciplinarity, different universities' policies and strategies, as well as different practices,
- 2) to develop an integrative process for achieving a joined knowledge and working base and
- 3) to generate recommendations for institutional change within the Alliance regarding a gradual institutionalisation of transdisciplinarity.

Two key paths have been conducted and stimulate future implementation into practice: firstly, the development of a shared understanding of transdisciplinarity addressing interaction, societal challenges, co-production of new knowledge and aiming for societal transformation. Secondly, the development of a concept of good practices by identifying and analysing a variety of different approaches to transdisciplinary initiatives. They represent all ENHANCE partners and the connection between the strategic and practice levels of transdisciplinary projects, the different levels of societal engagement and a broad scope of societal impacts.

WP3 agreed on the following broad shared understanding and definition of transdisciplinarity.

“Transdisciplinary research refers to the interaction between various academic disciplines and non-academic stakeholders to generate new knowledge between science and society to tackle sustainable development challenges and bring about societal transformation.”

Building a fuller picture of the diversity of approaches of transdisciplinarity for sustainable development in the ENHANCE Alliance and considering the identified triggers and barriers (e.g. university guidelines, changes in Executive Boards, funding possibilities, university governance, cultures, and strategies), we further identified good practice case studies from each Enhance university. This was built upon the results of the empiric study, comparative analysis, and advisory catalogue (see [D3.1 Discussion, Comparison and Analysis of Transdisciplinary Approaches in ENHANCE Universities](#) and [D3.2 Catalogue of Joint Advisory for supporting transdisciplinary research](#)). Based on the ENHANCE good practices, we further developed a methodologic approach which contains tools for a gradual institutionalisation of transdisciplinarity for sustainable development, resulting in this document: D3.4 Recommendations for piloting a new transformation toolbox for European institutions.

## 2. LITERATURE REVIEW/STATE OF THE ART INSTITUTIONALISATION OF TRANSDISCIPLINARITY

Transdisciplinarity as a research and practice mode for sustainable development and the involvement of stakeholders in research activities to tackle the complex transformation challenges have been increasing topics in policies, funding lines, research, and education in the last decades. The scientific literature on the field of methodology in science has also grown in line with the requirements for shaping sustainable development, particularly concerning the processes, the actors, the formats for generating and reflecting on knowledge, the methods and instruments and the social and scientific impacts. Implementing transdisciplinarity as a research mode and practice at universities and other academic institutions is still an emerging issue in scientific debate and literature.

The institutionalisation of transdisciplinarity, understood as a broadly existing support and anchoring at the universities' content and structural level, is not yet fully developed and visible. While there are various methods and instruments for conducting transdisciplinary research and education already established, there is still a need to develop supportive structures for promoting transdisciplinary research at universities in addition to the growing discourse. Anchoring and implementing transdisciplinarity as a research principle within academic institutions faces many challenges - alongside disciplinary and interdisciplinary research (Williams et al. 2024, Bammer 2020). This not only tackles the challenges but also the limits determined by higher education policy and administration, as well as some facilitating factors. The institutionalisation of transdisciplinary and participatory research is an ambitious goal in many respects: it strives to create participatory and application-oriented scientific cultures, continuous operational structures and committed university strategies that bring together the knowledge, actors and methods of joint knowledge production between science and society, in the long term. Its goal is to address the socio-ecological transformation challenges of the present in a solution-orientated and design-oriented approach.

On the other hand, the complexity of the topic of institutionalisation is represented by various authors. Multiple authors address it as a topic of institutional transformation and institutionalisation of transdisciplinary and participatory research as well as institutional governance on inter- and transdisciplinarity, knowledge co-production and cooperations in sustainability research (Williams et al. 2024, Dedeurwaerdere 2024, Vienni-Baptista et al. 2023, Vienni-Baptista and Klein 2022, Bammer 2020, Klein 2010). The discussions address structural, cultural, value-oriented and methodological components of the university systems. There are engagements at several Universities to enact transdisciplinary policies but also challenges and barriers to become a widespread practice (Vienni Baptista and Rojas-Castro 2020). The discussions also focus on promoting the institutionalisation of participatory research and transdisciplinarity to create long-term coalitions between academic and non-academic stakeholders, generate joint knowledge archives, and embed science in social life in the long term. One primary focus of this debate is enabling long-term knowledge exchange, mutual learning and joint research through the co-production of knowledge between science and society. It is mentioned that the strategic approaches for transdisciplinarity at academic institutions are often fragmented to contribute to the promotion, support and long-term establishment of transdisciplinary approaches to research and teaching and create a common culture for a circular transfer of knowledge (Bammer 2020). Vienni-Baptista and Rojas-Castro (2020) point out the importance of looking from different perspectives on transdisciplinarity: as a policy and as a practice. Transdisciplinarity "is a policy when a university decides to implement it as part of academic programs, research initiatives, and overall educational activities by initiating a set of actions whether they are reforms, plans, or guidelines" (Vienni et al. 2020, p. 1075). While as a practice, transdisciplinarity is defined as "activities that bring TD policy and associated forms of knowledge production to life" (Vienni-Baptista and Rojas-Castro 2020, p. 1076). While the enabling and hindering factors for transdisciplinary work in academic institutions, some authors situate them at the micro, meso and macro levels of the institutions (Williams et al. 2024 p. 5, Dedeuwaeredere 2024, Leurs et al. 2024, Vienni-Baptista et al. 2023, Klein 2023, Vienni-Baptista and Klein 2022, pp. 6-7, Bammer et al. 2020, Gläser 2019, Klein 2010). Each of these levels plays a role in shaping research content. The emergence of discipline-centred academic institutions is also

important to filter out hindering and facilitating factors that enable participatory research practices at the three levels. Williams et al. (2024) identified nine key dimensions as ‘critical, encompassing organisational values, organisational structure, Inter-organisational collaboration, leadership, training, teaching and curriculum, funding and reward structure’ (Williams et al. 2024, p. 6). The discourse also recognises a lack of academic awareness and reputation, academic career paths, long-term effects and insufficient funding pots and instruments for participatory research modes. The different levels of the institutionalisation of transdisciplinarity are embedded in spatial and temporal contexts, depending on national and regional funding lines and requirements. They incorporate specific building blocks resulting from the historical evolution of university governance structures and strategic developments. They have a methodological approach that brings into dialogue structures for the promotion of transdisciplinary research and practices of participatory research (Vienni-Baptista et al. 2023).

On the meso level, the formats provide the methodological framework for various research projects and individual initiatives, e.g. through living labs, citizen science, real-world experiments, and transformative science. However, the methods and formats also include the methodological approaches and systematic development of processes for the institutionalisation of transdisciplinarity to facilitate and promote participatory work and provide more targeted support. This also includes creating a common knowledge base, preparing structurally effective processes and forming coalitions of research management, researchers and social actors (Bammer et al. 2020). In the ENHANCE Alliance and as a focus of the WP3 working group, we followed this approach by creating a mutual learning environment through an integrative process of knowledge production towards a gradual institutionalisation of transdisciplinary research for sustainable development with the ENHANCE Alliance. This was conducted firstly by the co-production of a shared understanding and definition of transdisciplinarity, including a glossary as a living document (see [D3.2 Catalogue of Joint Advisory for supporting transdisciplinary research](#)). Secondly, co-designed work processes for identifying ENHANCE good practices regarding different approaches of transdisciplinary initiatives (strategic-oriented and practice-led ones) were established (see Chapter 5). Thirdly, recommendations for a transformation toolbox for the institutionalisation of transdisciplinarity at the ENHANCE universities for potential transferability and optional future implementation were co-produced (accumulated in this document; see Chapters 7, 8 and 9).

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## //PART II AIMS & VISIONS FOR INSTITUTIONALISATION

### 3. MISSION STATEMENT

For the research and innovation dimension of the ENHANCE Alliance, our mission is to develop a transformation agenda that fosters universities' role as drivers of sustainable development. We focus on institutional transformation for establishing and enabling a long-term knowledge exchange between science and society to drive responsible social transformation. Building coherence and considering the diversity of transdisciplinary approaches at the ENHANCE universities, framing policies and status of experiences, we set up an integrative process of knowledge production for transdisciplinarity.

Our joint vision is to generate a mutual learning environment at the ENHANCE Alliance for the research mode of transdisciplinarity to stimulate societal transformation for sustainable development. This includes different dimensions of institutional transformation for promoting transdisciplinarity at the ENHANCE universities:

- to support a culture and create value in research with science and society,
- to help policymakers and researchers understand transdisciplinarity and its project implementation
- to make universities more participatory in collaborating with society
- to gather and represent the diversity of transdisciplinary initiatives on strategic and practice-based levels for better stimulating, supporting and facilitating implementations (concept of joint definition, joint tools, concept of good practices)
- to set up more permanent structures to support transdisciplinary initiatives at the ENHANCE universities and between them (e.g. to link strategic activities supporting knowledge exchange of science and society with transdisciplinary projects, to set up a network of researchers supporting transdisciplinarity, to have integration experts for transdisciplinarity as permanent positions)
- to integrate transdisciplinarity in education programmes
- to facilitate transdisciplinary projects in research and education at each university and joint projects in the ENHANCE Alliance.

### 4. AIMS

This document provides some recommendations for piloting a transformation toolbox for the institutionalisation of transdisciplinarity for sustainable development at the ENHANCE technical universities. This purpose is related to the primary goal of ENHANCERIA to develop a transformation agenda which enables Technical Universities as drivers for sustainable development. The first objective is to mainstream, optimise and provide structures for institutionalising the knowledge exchange between science and society by addressing structures, strategies and study cases/pilots within the Alliance. Another objective is strengthening the international knowledge exchange on this topic within the Alliance. Finally, a third objective is to foster a common understanding of the relevance and encourage transdisciplinary initiatives in the Alliance by integrating the challenges and barriers.

The overarching objective of these recommendations for piloting a new transformation toolbox is to contribute to the structural framework for better supporting transdisciplinary initiatives at the ENHANCE institutions and in the ENHANCE Alliance. With this approach, we also want to contribute to developing systematic ways of institutional transformation in the university Alliance for enabling, supporting and evaluating transdisciplinary work, mainly transdisciplinary research. We do so by considering the diversity, unbalanced experiences, and possibilities of practising transdisciplinarity in academic work. Based on the

previous deliverables of WP3 and WP2 (the sample of transdisciplinary initiatives, the document discussing comparison, and the catalogue of joint advisory), it integrates the ENHANCE mapping activities, analysis as well as triggers and barriers for creating the right institutional environment for the development of transdisciplinary research. This document also relates to significant key literature on the topic of institutionalisation of transdisciplinarity for sustainable development. This framework will support ENHANCE universities in institutionalising transdisciplinarity by providing methods and formats for fostering and supporting transdisciplinary research. Based on a shared understanding of transdisciplinarity for a common goal and shared language among the ENHANCE universities as well as by sharing good practices (see [D3.2 Catalogue of Joint Advisory for supporting transdisciplinary research](#) and Chapter 5), the transformation toolbox is to be understood as a compilation of new and selected formats for emerging questions towards institutional transformation. It focuses on a method development for **anchoring transdisciplinarity** as a research principle tackling the SDGs at the European universities' institutions. This includes **recommendations** for strategic activities, supportive structures, and building frameworks for establishing a permanent knowledge exchange between science and society.

## 5. ENHANCE CONCEPT OF GOOD PRACTICES

Both common aspects and the diversity of practices, university cultures and methodologies are considered to develop synergies among the European Alliance. With the mapping of the various types of transdisciplinary initiatives related to university strategies and research practice, we identified and extracted examples of **ENHANCE good practices** which could serve as role models or key initiatives with exemplifying elements of the potential for institutionalising transdisciplinary approaches for sustainable development projects. Conceptualizing 'good practice' instead of 'best practice' seeks to address more the real-life situation, including university governance and policies of the ENHANCE universities and integrating the challenges, barriers and triggers for creating a favourable institutional environment for the opportunities for long-term knowledge exchange between science and society. The mapped initiatives are very content specific, they reflex on the current practices at ENHANCE universities. Each university has its own unique practices, culture and approaches when it comes to institutionalising transdisciplinarity. It is important to take these differences into account when developing a toolbox. Regarding the SWAFS Alliances (as stated at the Cross-Alliance Forum in November 2023), the approach of good practice is also addressed. It covers a concept that focuses on the transformation modules and is based on concrete and realized objectives. Therein, good practices range as shared common ground for the institutions e.g. from the state-of-the-art mapping exercises and analysis to governance, management and legal structures, toolboxes and training facilities, community building and knowledge transfer initiatives. The nomination of good practice is also used in guidelines to avoid focusing on the best solutions and to generate mutual learning environments (Wagner-Ahlf 2024). In health science, it means emphasising a 'can' rather than a 'must'. It provides a path to one possible solution, allows for ongoing development, and represents a current status and not an ultimate standard (Elkeles et al. 2021). The recognition of these different paths is essential within an Alliance, such as ENHANCE, as it puts the universities on a more equal footing. Not one approach on transdisciplinarity is better than the others. It also allows for an easier integration of approaches when they fit within the university cultures and methodologies. The concept of the ENHANCE good practice in WP3 follows this line of thinking for sharing knowledge and experiences and building capacities for supporting transdisciplinary research for sustainable development at the universities and for generating a common ground in terms of method and tools.

## 6. WHAT IS A TOOL FOR INSTITUTIONAL TRANSFORMATION?

As part of the integrative process of knowledge production among the ENHANCE Alliance, we discussed the common ground of a possible institutionalisation of transdisciplinarity for sustainable development regarding methods. Two main questions arise: To what extent do we characterise a possible tool for institutionalisation? What good practices are suitable tools for establishing a long-term exchange of science and society? Collaborative workshop discussions on the Miro whiteboard represent the scope of ideas; see Figure 01. The range of ideas represents manifold possibilities but also produces critical questions about how the approaches could be operationalised to implement in universities' strategic and research practices.

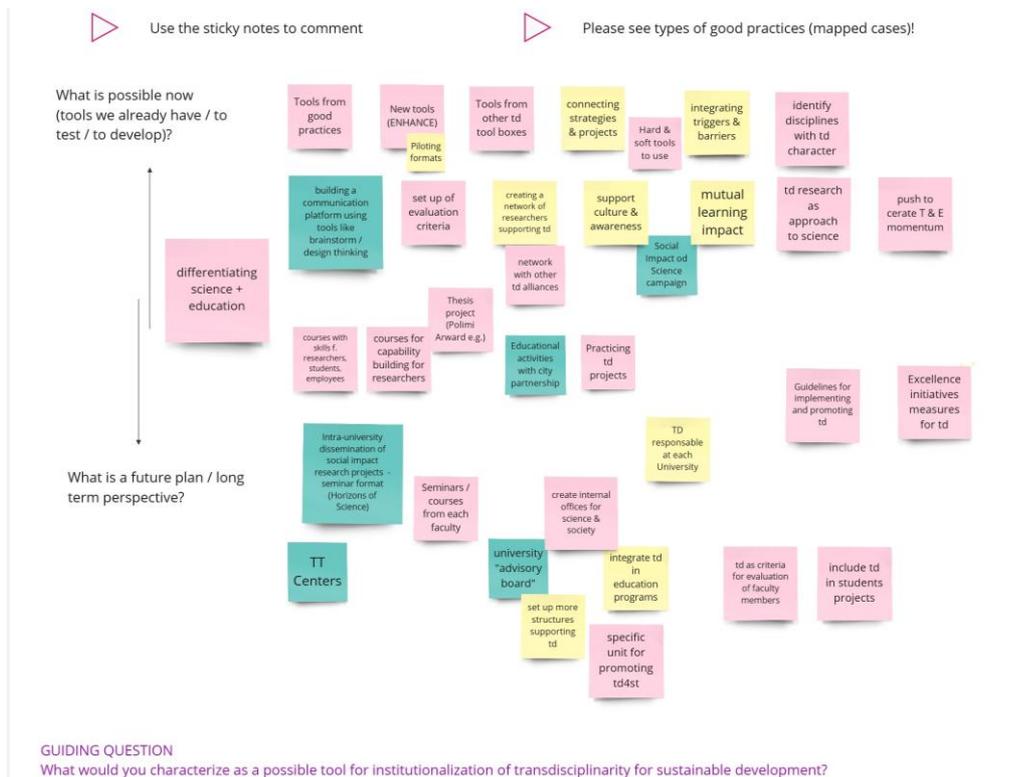


Figure 01 Brainstorming on possible tools for the institutionalisation of transdisciplinarity @ ENHANCERIA WP3 working group 2024

Lacking systematically developed approaches of identifying, classifying and developing tools for the institutionalisation of transdisciplinarity at universities, a first differentiation in our ENHANCE working group was to set up **ideas that work now and those including a future perspective**. In the category of 'Tools for now', we identified as follows: tools from selected ENHANCE good practices, tools connecting strategies to projects, tools integrating triggers and barriers for the institutional change, identifying disciplines with a character of transdisciplinarity, social impact and science campaign and courses for capability building for researchers to name a few one. They include possible information that is already available from the different mapping rounds. Some insights still need to be further investigated more in-depth. Further mapping, including desk research and specifying the tools, will continue in the ENHANCE+ project in the initiative 'Transdisciplinary lab for societal transformation'. In the category 'Tools for future perspective', we accumulate ideas which could give guidance to prospective measures for future institutionalisation of transdisciplinarity, e.g. set up a specific unit for promoting transdisciplinarity for sustainable development, develop transdisciplinarity criteria for evaluation of faculty members, establish a university advisory board for transdisciplinarity, creating seminars and training courses from each university among others.

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## // PART III RECOMMENDATIONS FOR A TRANSFORMATION TOOLBOX FOR INSTITUTIONALISING TRANSDISCIPLINARITY

### 7. METHODOLOGIC APPROACH FOR DEVELOPING TOOLS FOR INSTITUTIONALISING TRANSDISCIPLINARITY IN STRATEGY, RESEARCH AND EDUCATION

Building coherence for a shared understanding of what we mean with both the process and the product of tools for institutionalisation of transdisciplinarity, we discussed the meaning and importance of setting up tools or toolkits in general to drive forward concrete measures for implementation. The aim was to provide synergetic ways to enable transdisciplinarity more in research and education and possibly anchor it more profoundly in ENHANCE University's strategies and structures. The first steps for this were to raise awareness for transdisciplinary approaches and their institutionalisation among the Alliance and internally at the ENHANCE partner universities, communicate it to a broader science community (e.g. FOREU2 Alliance, ITD Alliance, td-net, td-academy etc.) and a broader public (see [ENHANCE platform on transdisciplinarity](#) and [te.ma science communication channel on transdisciplinarity](#)) as well as to drive more concrete suggestions and measures forward for implementing in practice like with these recommendations for a transformation toolbox. Therefore, in the mutual learning environment and line with a broad understanding of the term and concept of transdisciplinarity, we also agreed on a broad understanding and scope of tools respectively for institutional transformation in two dimensions: first generating **joint working tools** for the establishment of the ENHANCE mutual learning environment through designing an integrated process of knowledge exchange, and second selecting **possibly transferable tools from identified ENHANCE good practices**. To this extent, the learnings result from both the joint working experiences during the ENHANCE reporting period and from gaining insights about the ENHANCE good practices through mappings, interviews and in-depth desktop research.

In summary, the ENHANCE tools for the institutionalisation of transdisciplinarity in this transformation toolbox refer to the establishment and facilitation of processes and products for the long-term knowledge exchange between research and society. A central concern is to ensure that institutional change for promoting transdisciplinarity is not carried out at individual universities but as a joint project of the ENHANCE Alliance to create synergies. The tools thus include conceptual ideas and experiences to transdisciplinary initiatives, methods and approaches in the form of various formats such as living labs and workshop formats, various newly created facilities and offerings such as the ENHANCE platform for transdisciplinarity, as well as jointly produced research results in the form of publications, reports and this transformation toolbox. The following graphic gives an overview of the scope of processes and products within the mutual learning environment of the ENHANCE Alliance, which both the joint working tools and the selected tools from ENHANCE good practices address (see Figure 02).

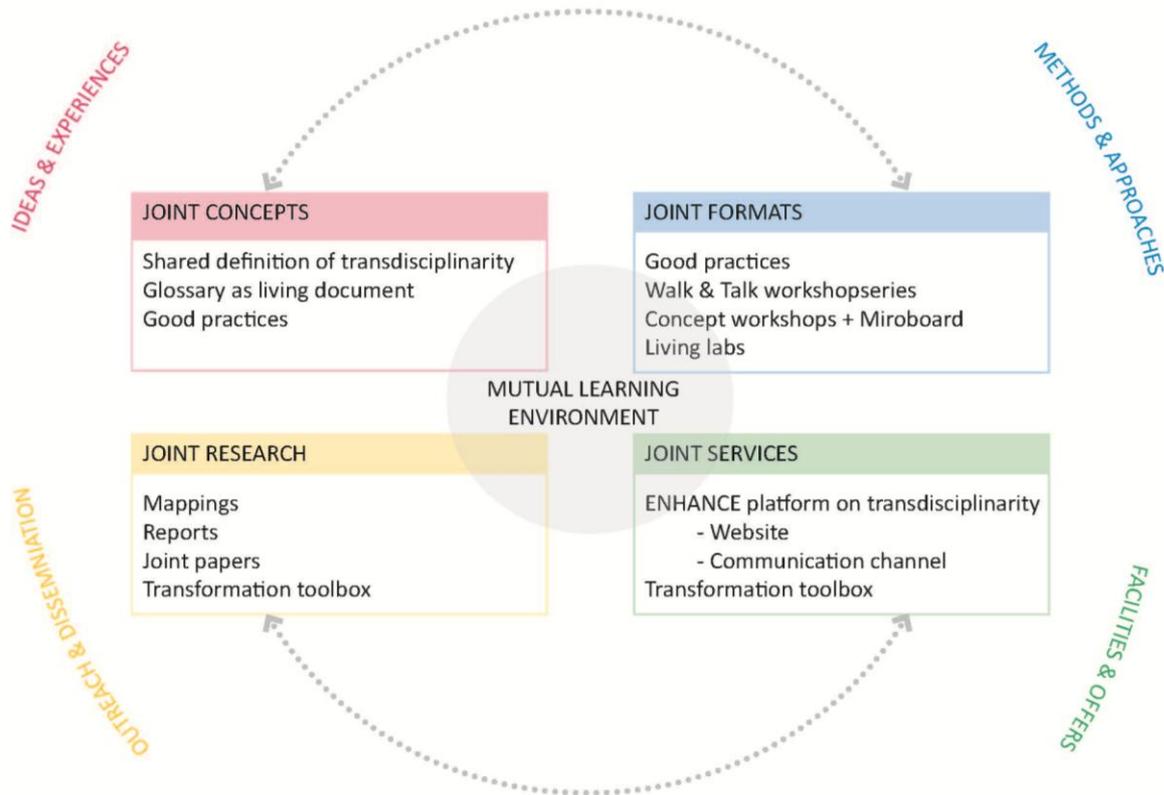
**THE ENHANCE MUTUAL LEARNING ENVIRONMENT**


Figure 02 The ENHANCE joint tools for the institutionalisation of transdisciplinarity – the mutual learning environment @ Kathrin Wieck 2024

**8. JOINT TOOLS FOR INTEGRATED PROCESS**

The joint tools for the knowledge exchange among the ENHANCE group resulted from the integrated working process of the focus area ‘Sustainable development through transdisciplinary research’. They work as design tools for creating an integrative development process for a mutual learning environment. Learning from each other’s respectively specific institutional experiences, and understandings and framing university conditions to enable the practice of transdisciplinary research and education was more important than giving coaching and training lessons from ENHANCE universities with extended institutional strategies to the ones with less experience, funding possibilities or different university culture and policy directions (e.g. concerning entrepreneurship, technologic innovations or reward culture of research disciplines). In total, the **joint working tools** include mappings, concept workshops and miroboard as joint working platform, joint paper writing and publishing, the ENHANCE Walk & Talk Format, the ENHANCE definition on transdisciplinarity, The ENHANCE glossary as living document, the ENHANCE good practices, the ENHANCE platform on transdisciplinarity (see [ENHANCE platform on transdisciplinarity](#) and [te.ma science communication channel on transdisciplinarity](#)). They will be introduced shortly as follows:

**Mapping:** Based on three mapping rounds in the first reporting period (see D3.1 Discussion, Comparison and Analysis of Transdisciplinary Approaches in ENHANCE Universities p 9), we conducted a next mapping round with more in-depth- identifying transdisciplinary initiatives for the topic of sustainable development in the university dimensions of strategy, research, and education (see upcoming Article and Menu of pathways).

**Concept workshops and miroboard as a working platform:** We conducted a series of conceptual workshops framed by initial research questions and approaches and represented through a miroboard as an interactive working platform. The concepts have been developed concerning scientific literature and aim to develop criteria to establish a continuous working process on our shared understandings (on transdisciplinarity, on sustainable development, on societal impact, on levels of engagement, on tools for institutionalisation) and on selecting ENHANCE good practices, on synergies, on tool development.

**Joint paper writing and publishing:** The deliverables in this Work package include two publications to gain insights from the empirical research progress of the focus area on transdisciplinarity for sustainable development. The working group members have written a joint paper one paper on lessons learnt from transdisciplinary research which focuses on learnings from 1) the common understanding of transdisciplinarity, 2) the diversity of transdisciplinary approaches to sustainable development, and 3) the different institutional structures that enable and promote transdisciplinary approaches to sustainability. The paper was published in 2023 in the international journal Foundations of management (see FOM article). A second article in a joint writing process investigates empirical insights about the institutionalisation of transdisciplinarity at ENHANCE technical universities. The article is in the review phase and will be submitted to the 'International Journal of Sustainability in Higher Education' in November 2024.

**ENHANCE Walk & Talk Format:** The 'Walk & Talk' format was conceptualised to provide researchers and other relevant staff with an opportunity to learn about local research projects that promote knowledge exchange between science and society and to better understand the policies and structures at ENHANCE member universities that support these projects. The workshop series aims to complement and reflect on the mapping and analysis of transdisciplinary initiatives within ENHANCE and ongoing inter-university knowledge exchange on this topic. It allows networking with relevant colleagues in the ENHANCE universities and directly with local projects. The format also aims to make integrated knowledge more experienceable and foster an environment of mutual learning by stimulating discussions at a higher strategic level, at the project level for implementation, and for transferability.

**ENHANCE definition of transdisciplinarity:** Based on our empirical the WP3 working group identified the four core features framing a shared broad understanding of transdisciplinarity and embedding the different approaches, enabling structures and experiences of supporting and conducting transdisciplinarity at the ENHANCE universities. It also considers that different terms may be used to characterise this knowledge exchange between science and society, such as co-creation, co-design and co-production. The core features include:

- Interaction between different academic disciplines and non-academic stakeholders to address societal problems.
- The problem to be addressed relates to a major societal challenge, e.g. climate change, global health, sustainable development.
- A major output is producing new (solution-oriented and integrated) knowledge.
- A transformative agenda and/or intention to achieve societal impact underpins the approach.

ENHANCE defines transdisciplinary research as "the interaction between various academic disciplines and relevant non-academic stakeholders to drive knowledge exchange between science and society to tackle sustainable development challenges and bring about societal transformation". (see D3.2 Catalogue).

**ENHANCE glossary as a living document:** The focus area 1 on transdisciplinarity for sustainable development has created a glossary as a living document to identify the concepts used across the Alliance and agree upon definitions for a common understanding. Therefore, it is related to the ENHANCE definition of transdisciplinarity. It includes identified keywords for Focus Area 1 and towards the transdisciplinary approaches to sustainable development bundled from the mapping activities (cases, survey, interviews). The identified concepts and keywords were mapped in Miro boards, which enabled a visual and interactive

discussion about taxonomies, relationships and meanings. This glossary and the definitions included can be extended and refined in the future.

**ENHANCE platform on transdisciplinarity:** A common platform on transdisciplinarity for sustainable development was developed aiming to support institutional exchange about mainstreaming transdisciplinarity through strengthening the network and capacity building with methods and structures and stimulation of future joint transdisciplinary approaches. Furthermore, it seeks to promote the institutional transformation (institutionalisation) of transdisciplinarity within the ENHANCE Alliance. In future, it also seeks to formulate transferable workshop concepts and to provide training for transdisciplinary activities with social stakeholders. The ENHANCE platform on transdisciplinarity contains two implemented structures:

- first, the ENHANCE website with a stable content fostering a common knowledge base in the Alliance, including all reports and publications of the working group

<https://enhanceuniversity.eu/enhanceria/sustainable-development/>)

- second, a science communication channel on transdisciplinarity with a comment function. The discussion channel is a cooperation with the online platform te.ma - a public space for science and debate. (Due to limited funding and maintenance opportunities, further interactive services must be outsourced.) In this channel, we present the research mode of transdisciplinarity and discuss its gradual institutionalisation in the ENHANCE Alliance. With the aim of creating a common agenda for research and innovation, the continuous exchange of knowledge between research and society plays a key role. It is still a major challenge to how transdisciplinary work can be better facilitated, supported and promoted by universities. Considering the diversity of transdisciplinary approaches in the Alliance, we discuss how this can be systematically developed as a common approach. We outline what transdisciplinary research is, how we have created a mutual learning environment, and which criteria need to be considered as examples of knowledge transfer with society. (<https://te.ma/chn/transdisciplinarity/>)

## 9. SELECTED TRANSFERABLE TOOLS FROM ENHANCE GOOD PRACTICES

Related to the ENHANCE concept of good practices (see Chapter above) and as a result of the continuous mapping process (three mapping rounds 2021/2022, mappings and interviews concerning transdisciplinarity for sustainable development in 2023/2024 and the mapping from seven Walk & Talks in the period from September 2022 to May 2024) a selection of tools has been made to explore innovative and creative approaches for implementing transdisciplinary approaches in the areas of strategy, research and education at the ENHANCE universities. In workshops and at the Miro board (see figure 03), these tools have been discussed as suitable formats, processes, and ideas for paving the way for better supporting and promoting transdisciplinarity for sustainable development at the ENHANCE member universities and for transferring it to other ENHANCE university or beyond.





		<a href="#">/wiki/Norsk/Universitetskommune</a>	
02 Institutional strategy / Strategic plan / University guidelines			
	NTNU STRATEGY KNOWLEDGE FOR A BETTER WORLD <a href="https://www.ntnu.edu/strategy">https://www.ntnu.edu/strategy</a>	TUB ENERGY TRANSITION MEASURES	
	<b>UPV SIRVE</b> <a href="https://www.upv.es/contenidos/upv_sirve/en/upv_sustainable/">https://www.upv.es/contenidos/upv_sirve/en/upv_sustainable/</a>		
	TUB Transfer strategy <a href="https://www.static.tu.berlin/fileadmin/www/1000000/Transfer/Transferstrategie_TU_Berlin.pdf">https://www.static.tu.berlin/fileadmin/www/1000000/Transfer/Transferstrategie_TU_Berlin.pdf</a>		
03 Strategic unit / facility			
	<b>TUB Central OFFICE FOR SCIENCE AND SOCIETY</b> <a href="https://www.tu.berlin/science-and-society">https://www.tu.berlin/science-and-society</a>	TUB Service facility of Cooperation and Consulting. KUBUS + SCIENCE SHOP <a href="https://www.zewk.tu-berlin.de/v_menu/kubus_nachhaltigkeit_umwelt/">https://www.zewk.tu-berlin.de/v_menu/kubus_nachhaltigkeit_umwelt/</a>	Central research institute. ZTG-CENTER FOR TECHNOLOGY AND SCIENCE <a href="https://www.tu.berlin/en/ztg">https://www.tu.berlin/en/ztg</a>
	RWTH Strategic staff unit SUSTAINABILITY OFFICE <a href="https://www.rwth-aachen.de/cms/root/die-rwth/einrichtungen/verwaltung/stabsstellen/~ifpc/nachhaltigkeit-und-hochschulgovernance/?!idx=1">https://www.rwth-aachen.de/cms/root/die-rwth/einrichtungen/verwaltung/stabsstellen/~ifpc/nachhaltigkeit-und-hochschulgovernance/?!idx=1</a>		RWTH Platform for ID, TD and collaboration HUMTECH <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~fvnnc/Mission-Interdisziplinare-Forschung/f/lidx/1/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~fvnnc/Mission-Interdisziplinare-Forschung/f/lidx/1/</a>
	TUB staff position. Transdisciplinary Didactics <a href="https://www.tu.berlin/en/vp-sl/team/thorsten-philipp">https://www.tu.berlin/en/vp-sl/team/thorsten-philipp</a>		
04 Funding Scheme / Programme (diverse levels)			
	<b>RWTH Excellence Initiative, LIVING LAB INCUBATOR</b> <a href="https://www.rwth-aachen.de/cms/root/Die-RWTH/Exzellenzinitiative/~eob/Exzellenzinitiative/?!idx=1">https://www.rwth-aachen.de/cms/root/Die-RWTH/Exzellenzinitiative/~eob/Exzellenzinitiative/?!idx=1</a>	UPV Programme for young job seekers. Investigo programme for green economy and ecological transition <a href="https://www.upv.es/entidades/vcampus/en/upv-investigo-program/">https://www.upv.es/entidades/vcampus/en/upv-investigo-program/</a>	NTNU Strategic research initiative. SusRes@NTNU PROGRAMME <a href="https://www.ntnu.edu/sustainability/susres">https://www.ntnu.edu/sustainability/susres</a>

	TUB Berlin University Alliance, TD LABS <a href="https://www.berlin-university-alliance.de/en/commitments/knowledge-exchange/research-forums/index.html">https://www.berlin-university-alliance.de/en/commitments/knowledge-exchange/research-forums/index.html</a>	WUT Programme. WUT INNOVATION INCUBATOR. <a href="https://www.akcelerator.pw.edu.pl/index.html">https://www.akcelerator.pw.edu.pl/index.html</a>	
	WUT IDUB: EXCELLENCE INITIATIVE - RESEARCH UNIVERSITY PROGRAMME <a href="https://www.excellence.pw.edu.pl/excellence">https://www.excellence.pw.edu.pl/excellence</a>	<b>WUT Programme.</b> <b>WUT ACCELERATOR</b> <a href="https://dziitt.pw.edu.pl/dla-pracownikow-pw/przedsiębiorczość-startupy-oraz-spolki-spin-off-i-spin-out/akcelerator-pw/">https://dziitt.pw.edu.pl/dla-pracownikow-pw/przedsiębiorczość-startupy-oraz-spolki-spin-off-i-spin-out/akcelerator-pw/</a>	
	<b>POLIMI Academic social responsibility and engagement programme.</b> <b>POLISOCIAL</b> <a href="http://www.polisocial.polimi.it/en/home-en/">http://www.polisocial.polimi.it/en/home-en/</a>	<b>CHALMERS Strategic thematic platforms, research-based partnerships with companies.</b> <b>AREAS OF ADVANCE</b> <a href="https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/">https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/</a>	
05 Strategic cooperation model / Partnerships / Alliances			
	<b>RWTH Living lab incubator</b> <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~mgveg/Living-Labs-Incubator/?lidx=1">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~mgveg/Living-Labs-Incubator/?lidx=1</a>	UPV EU partnership between cities, universities, civil society and businesses.GrowGreen <a href="https://growgreenproject.eu/">https://growgreenproject.eu/</a>	NTNU Multistakeholder cooperation. DATA-DRIVEN CO-CREATION ON URBAN INNOVATION
	RWTH Innovation Factory RWTH CAMPUS <a href="https://rwth-if.com/en/">https://rwth-if.com/en/</a> <a href="https://www.rwth-campus.com/">https://www.rwth-campus.com/</a>	UPV Business alliance. 12 chairs with objectives grouped around sustainability <a href="https://www.lasprovincias.es/content-local/catedras-empresa-upv-unidas-por-la-sostenibilidad/?ref=https%3A%2F%2Fwww.lasprovincias.es%2Fcontent-local%2Fcatedras-empresa-upv-unidas-por-la-sostenibilidad%2F">https://www.lasprovincias.es/content-local/catedras-empresa-upv-unidas-por-la-sostenibilidad/?ref=https%3A%2F%2Fwww.lasprovincias.es%2Fcontent-local%2Fcatedras-empresa-upv-unidas-por-la-sostenibilidad%2F</a>	
	CHALMERS Partnerships between institutions and industries TIPCS	UPV Cooperation framework agreement UPV-Valencia. City University Binomial, for climate-neutrality by 2030 <a href="https://www.upv.es/entidades/vcampus/en/city-university-binomial-the-challenge-of-decarbonization/">https://www.upv.es/entidades/vcampus/en/city-university-binomial-the-challenge-of-decarbonization/</a>	
		POLIMI Contract for offering services to National Authorities.	

		Development of intelligent platform to manage bridges due to an integrated sensor network and advanced simulation models	
<b>06 (Strategic) Platforms / Hubs</b>			
	RWTH PLATFORM FOR ID, TD and collaboration HUMTECH <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~fvnc/Mission-Interdisziplinaere-Forschung-f/lidx/1/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~fvnc/Mission-Interdisziplinaere-Forschung-f/lidx/1/</a>	<b>TUB Strategic platform living labs. STADTMANUFAKTUR</b> <a href="https://stadtmanufaktur.info/en/">https://stadtmanufaktur.info/en/</a>	
	<b>RWTH PLATFORM on structural change REVIERa</b> <a href="https://www.reviera.rwth-aachen.de/cms/~ogivr/reviera/?lidx=1">https://www.reviera.rwth-aachen.de/cms/~ogivr/reviera/?lidx=1</a>	TUB Tool research promotion. DIALOGUE PLATFORM <a href="https://www.dialogplattform.tu-berlin.de/aktuelles/parameter/en/">https://www.dialogplattform.tu-berlin.de/aktuelles/parameter/en/</a>	
	RWTH PLATFORM on communication and outreach FUTURE LAB AACHEN <a href="https://futurelab-aachen.de/en/">https://futurelab-aachen.de/en/</a>	TUB Platform for Transdisciplinary Research and Studies. TD Academy <a href="https://td-academy.org/">https://td-academy.org/</a>	
	RWTH Research & Teaching on Responsible Research & Innovation. RRI HUB <a href="https://www.hub.rwth-aachen.de/cms/~otobg/HUB/?lidx=1">https://www.hub.rwth-aachen.de/cms/~otobg/HUB/?lidx=1</a>	<b>CHALMERS Strategic thematic platforms, research-based partnerships with companies. AREAS OF ADVANCE</b> <a href="https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/">https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/</a>	
	RWTH Open Science and Networking Platform KNOWLEDGE HUB		
<b>07 Laboratory/Labs / Network/Strategic Projects</b>			
	TUB/BUA Laboratory for transdisciplinary research, TD Lab <a href="https://www.tu.berlin/science-and-society/projekte-und-forschung/td-lab-berlin-university-alliance">https://www.tu.berlin/science-and-society/projekte-und-forschung/td-lab-berlin-university-alliance</a>	<b>NTNU 1 of 9 Digital Transformation Initiative. AUTOFERRY PROJECT</b> <a href="https://www.ntnu.edu/autoferry">https://www.ntnu.edu/autoferry</a>	<b>TUB Living lab Campus Park. Climate Hood</b> <a href="https://stadtmanufaktur.info/en/living-labs/climatehood_campuspark-charlottenburg/CLIMATEHOOD">https://stadtmanufaktur.info/en/living-labs/climatehood_campuspark-charlottenburg/CLIMATEHOOD</a>
	RWTH Network OECHEr LAB <a href="https://oecherlab.de/">https://oecherlab.de/</a>		RWTH 3 major projects for the transformation to a biobased economy. MODELLREGI ON BIOÖKONOMIE

			<a href="https://www.biooekonomierevier.de/home">https://www.biooekonomierevier.de/home</a>
	<p>POLIMI Laboratory, Strategic project CITTÁ STUDI CAMPUS SOSTENIBILE <a href="https://www.polimi.it/en/the-politecnico/university-projects/citta-studi-sustainable-campus">https://www.polimi.it/en/the-politecnico/university-projects/citta-studi-sustainable-campus</a></p>		<p><b>CHALMERS Living lab in cooperation with companies from the building industry.</b> <b>HSB LIVING LABS</b> <a href="https://www.chalmers.se/en/areas-of-advance/energy/joint_initiatives/HSB-Living-Lab/Pages/default.aspx">https://www.chalmers.se/en/areas-of-advance/energy/joint_initiatives/HSB-Living-Lab/Pages/default.aspx</a></p>
	<p>POLIMI Strategic project - interdisciplinary network of scholars from engineering, architecture and design departments. META - Social Sciences and Humanities for Science and Technology <a href="https://www.meta.polimi.it/">https://www.meta.polimi.it/</a></p>		<p>TUB Temporary experimental lab teaching and learning on science (-2023) MALL-ANDERS <a href="https://www.mall-anders.berlin/mall-anders-en">https://www.mall-anders.berlin/mall-anders-en</a></p>
	<p><b>POLIMI Interdepartmental Research Lab / University Makerspace.</b> <b>POLIFACTORY</b> <a href="mailto:polifactory@polimi.it">polifactory@polimi.it</a></p>		<p>TUB Spatial laboratory. UdK + TUB UNIVERSAL SPACES</p>
			<p>RWTH Living lab on sustainable fashion. nACHhaltig angezogen part of course in MA Sociology <a href="https://nachhaltig-angezogen.de/">https://nachhaltig-angezogen.de/</a></p>
Public event (not further identified)			
	<p>RWTH Science night <a href="https://www.rwth-aachen.de/cms/root/die-rwth/rwth-events/oeffentlichkeitswirk-same-wissenschaftsev/~befecf/rwth-wissenschaftsnacht-5-vor-12-/?lidx=1">https://www.rwth-aachen.de/cms/root/die-rwth/rwth-events/oeffentlichkeitswirk-same-wissenschaftsev/~befecf/rwth-wissenschaftsnacht-5-vor-12-/?lidx=1</a></p>		
	<p>RWTH Technic event night <a href="https://blog.rwth-aachen.de/elektrotechnik/en/erste-rwth-greentech-late-night-im-theater-aachen/">https://blog.rwth-aachen.de/elektrotechnik/en/erste-rwth-greentech-late-night-im-theater-aachen/</a></p>		

Table 01 Mapped strategy-driven transdisciplinary initiatives (orange = selected as ENHANCE good practice) @ ENHANCERIA WP3 working group 2024

## 9.2 PROJECT-DRIVEN TRANSDISCIPLINARY INITIATIVES

The second table shows the selection of all mapped practice-led (research projects, education projects) transdisciplinary initiatives. According to the first table, here, all initiatives in the section university dimension of research and education and a mix of both are accumulated. Some of them also have a strategic impact at a second glance. The significant characteristics are here given by research or by education. The ENHANCE members characterised the identified project initiatives as following **five types**:

### // 5 TYPES OF PROJECT-DRIVEN TRANSDISCIPLINARY INITIATIVES

<b>01</b> Research centre / Knowledge cluster	Research centres for doing research, disciplinary, interdisciplinary, and transdisciplinary knowledge clusters, are local innovation systems with high internal and external networking and knowledge-sharing capabilities.
<b>02</b> Research programme / Research teams	Network of scientists and professionals, developing their programs of research, building interdisciplinary networks, and working with decision-makers to maximise research impact.
<b>03</b> Research projects/labs	Research on specific topics linked to practice and addressing societal problems in life world context.
<b>04</b> Living labs	Innovative experimentation format to initiate transformation processes and facilitates collaboration between researchers and societal actors in a real-life context.
<b>05</b> Master courses/programmes/projects	Area of education and curricula.

	RESEARCH*	RESEARCH + EDUCATION // EDUCATION – RESEARCH*	EDUCATION*
*column titles relates to the priorities defined by the ENHANCE partner university in the mapping process			
<b>01</b> Research center / Knowledge cluster			
	<b>NTNU NTRANS (FME) research center conduction research on the role of energy system in the transition to zero-emission society</b> <a href="https://www.ntnu.no/ntrans">https://www.ntnu.no/ntrans</a>	NTNU Interdisciplinary centre for biodiversity research, education +communication. GJAEREVOLL CENTRE <a href="https://www.ntnu.edu/gjaerevoll">https://www.ntnu.edu/gjaerevoll</a>	
	CHALMERS (RESEARCH) CENTER FOR HEALTHCARE / platform acting on strategic political level and on interactive action level. Center for Healthcare Architecture (CVA)		

	<a href="https://www.chalmers.se/en/centres/cva/">https://www.chalmers.se/en/centres/cva/</a>		
	CHALMERS Centres for transdisciplinary studies (Mistra Urban Futures 2009-2019). MISTRA URBAN FUTURES (to 2020) AND GOTHENBURG CENTRE FOR SUSTAINABLE DEVELOPMENT (GMV) <a href="https://www.mistraurbanfutures.org/en">https://www.mistraurbanfutures.org/en</a>		
	<b>NTNU Cross-disciplinary knowledge cluster. SMART SUSTAINABLE CITIES</b> <a href="https://www.ntnu.edu/smartcities">https://www.ntnu.edu/smartcities</a>		
<b>02 Research programme</b>			
	<b>UPV Research programme INBIO / POLISABIO / UNISALUT, Valencia universities + regional hospitals</b> <a href="https://www.inbio.es/">https://www.inbio.es/</a>	WUT Programme. MedTech-Athon - engineers for medicine <a href="https://www.cezamat.eu/events/medtech-athon/">https://www.cezamat.eu/events/medtech-athon/</a>	NTNU Education programme. HUMANITIES IN PRACTICE <a href="https://www.ntnu.no/hip">https://www.ntnu.no/hip</a>
		<b>Cooperation model + research teams. ISALAB</b> <a href="https://headconf.org/wp-content/uploads/pdfs/8395.pdf">https://headconf.org/wp-content/uploads/pdfs/8395.pdf</a>	<b>NTNU Cooperation model + education teams. EXPERTS IN TEAMWORK (EIT)</b> <a href="https://www.ntnu.edu/eit">https://www.ntnu.edu/eit</a>
<b>03 Research project / lab</b>			
	UPV Research project. COLLECTION CARE <a href="https://www.upv.es/entidades/ACU/info/1227200normalc.html">https://www.upv.es/entidades/ACU/info/1227200normalc.html</a>	UPV Research project. Artistic residency in a research institute. AR(t) IBMCP Residencia Artística <a href="https://www.upv.es/entidades/ACU/info/1227200normalc.html">https://www.upv.es/entidades/ACU/info/1227200normalc.html</a>	
	UPV R&D&I Center = Lab for immersive Neurotechnologies at Institute of Research	UPV Restoration of a church classified as cultural heritage. RESTORATION of church San Nicolas/San Juan	

	and Innovation in Bioengineering. LENI LAB <a href="https://lableni.webs.upv.es/">https://lableni.webs.upv.es/</a>	<a href="https://www.upv.es/noticias-upv/noticia-6288-san-nicolas-es.html">https://www.upv.es/noticias-upv/noticia-6288-san-nicolas-es.html</a>	
	RWTH Citizen Science Research project. CitSciID (Citizen identity, Citizen citizenship) <a href="https://www.biologiedidaktik.rwth-aachen.de/cms/biologiedidaktik/Forschung/Projekte/~bcbued/CitSciID/lidx/1/">https://www.biologiedidaktik.rwth-aachen.de/cms/biologiedidaktik/Forschung/Projekte/~bcbued/CitSciID/lidx/1/</a>	WUT Project. HUMAN SMART CITIES – Rawicz <a href="https://rawicz.pl/urząd-i-samorząd/fundusze-zewnetrzne/human-smart-city/">https://rawicz.pl/urząd-i-samorząd/fundusze-zewnetrzne/human-smart-city/</a>	
	<b>WUT Project.</b> <b>DIGITAL AGORA PROJECT</b> <a href="https://www.sciencedirect.com/science/article/pii/S0264837721003379?via%3Dihub">https://www.sciencedirect.com/science/article/pii/S0264837721003379?via%3Dihub</a>	WUT Project. HUMAN SMART CITIES – Żuromin <a href="https://repo.pw.edu.pl/info/projectZuromin">https://repo.pw.edu.pl/info/projectZuromin</a>	
	<b>Research initiative with City Council of Valencia</b> <b>DONES DE CIENCIA</b> <a href="https://donesdeciencia.webs.upv.es/es/">https://donesdeciencia.webs.upv.es/es/</a>	UPV 'Learning by doing' launchpad for students. Generacion Espontanea, GE's program <a href="https://generacionespontanea.upv.es/">https://generacionespontanea.upv.es/</a>	
<b>04 Living labs</b>			
	RWTH Living Lab. REALLABOR NIVELSTEIN <a href="https://www.rwth-aachen.de/cms/root/die-rwth/aktuell/pressemitteilungen/november-2020/~lkxem/erforschung-kuenftiger-rohstoff-und-ene/?lidx=1">https://www.rwth-aachen.de/cms/root/die-rwth/aktuell/pressemitteilungen/november-2020/~lkxem/erforschung-kuenftiger-rohstoff-und-ene/?lidx=1</a>	TUB Living lab. GO Sustainable Berlin <a href="https://stadtmanufaktur.info/en/living-labs/go-sustainable-berlin/">https://stadtmanufaktur.info/en/living-labs/go-sustainable-berlin/</a> <a href="https://www.go-sustainable.de/">https://www.go-sustainable.de/</a>	
	RWTH Innovation space on biobased textile research. BIOTEXFUTURE <a href="https://biotexfuture.info/">https://biotexfuture.info/</a>	TUB Living lab. Climate-Energy-Water <a href="https://stadtmanufaktur.info/en/living-labs/climate-energy-water/">https://stadtmanufaktur.info/en/living-labs/climate-energy-water/</a>	
	RWTH Living Lab. URBAN ENERGY LAB 4.0 <a href="https://www.uel4.0.de/Home/">https://www.uel4.0.de/Home/</a>	TUB Living lab. Urban Open Space + <a href="https://stadtmanufaktur.info/en/living-labs/urban-open-space/">https://stadtmanufaktur.info/en/living-labs/urban-open-space/</a>	

	<p>RWTH Living Lab: Regional Innovation, Digital Responsibility and Innovation, Sustainable innovation.</p> <p>HEALTHCARE INNOVATION LAB</p> <p><a href="https://www.time.rwth-aachen.de/cms/TIME/Forschung/~mphtv/Healthcare-Innovation-Lab/">https://www.time.rwth-aachen.de/cms/TIME/Forschung/~mphtv/Healthcare-Innovation-Lab/</a></p>	<p>TUB Living lab. Platform for urban exchange.</p> <p>Future for Neu-Hohenschönhausen</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/future-for-neu-hohenschoenhausen/">https://stadtmanufaktur.info/en/living-labs/future-for-neu-hohenschoenhausen/</a></p>	
	<p>RWTH Living lab.</p> <p>RAINWATER LIVING LAB</p> <p><a href="https://www.ersrainwaterlivinglab.rwth-aachen.de/cms/~ocfle/ERSRAINWATERLIVINGLAB">https://www.ersrainwaterlivinglab.rwth-aachen.de/cms/~ocfle/ERSRAINWATERLIVINGLAB</a></p>	<p>TUB Real Lab on Climate Impact Adaptation.</p> <p>CLIMATE ART LAB 21. Centre for Art and Urban Studies (ZK/U)</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/climate-art-lab-21/">https://stadtmanufaktur.info/en/living-labs/climate-art-lab-21/</a></p> <p><a href="https://www.zku-berlin.org/">https://www.zku-berlin.org/</a></p>	
	<p>RWTH Living lab.</p> <p>ACCorD-KORRIDOR FÜR NEUE MOBILITÄT AACHEN-DÜSSELDORF</p> <p><a href="https://www.accord-testfeld.de/">https://www.accord-testfeld.de/</a></p>	<p>TUB Living lab.</p> <p>Social environment protection versus climate protection</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/social-environment-protection-versus-climate-protection/">https://stadtmanufaktur.info/en/living-labs/social-environment-protection-versus-climate-protection/</a></p>	
	<p>RWTH Living lab.</p> <p>ERP-Innovation- Lab für integrierte Business Applications</p> <p><a href="https://www.center-iba.com/en/infrastructure/">https://www.center-iba.com/en/infrastructure/</a></p>	<p>TUB Living lab.</p> <p>Citizens create climate knowledge</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/citizens-create-climate-knowledge/">https://stadtmanufaktur.info/en/living-labs/citizens-create-climate-knowledge/</a></p>	
	<p>RWTH Living lab.</p> <p>Smart-Systems-Innovation-Lab</p> <p><a href="https://eice.rwth-campus.com/forschungsergebnis/">https://eice.rwth-campus.com/forschungsergebnis/</a></p>	<p>TUB Living lab.</p> <p>Experience. Campus. Health and movement in an urban context</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/experience-campus/">https://stadtmanufaktur.info/en/living-labs/experience-campus/</a></p>	
	<p>RWTH Living lab.</p> <p>ACademie für kollaborative Stadtentwicklung</p> <p><a href="https://www.pt.rwth-aachen.de/go/id/mtofe">https://www.pt.rwth-aachen.de/go/id/mtofe</a></p>	<p>TUB Living lab.</p> <p>MY-CO PLACE. Architecture of sustainable growth</p> <p><a href="https://stadtmanufaktur.info/en/living-labs/my-co-place/">https://stadtmanufaktur.info/en/living-labs/my-co-place/</a></p>	
	<p>RWTH Living lab.</p>	<p><b>TUB</b></p>	

	CoProGrün- Co-produzierte Grünzüge als nachhaltige kommunale Infrastruktur <a href="http://www.coprogruen.de/">http://www.coprogruen.de/</a>	<b>Living lab experiment. Transdisciplinary format: hands-on research. COLLOC WORKSHOP SERIES</b> <a href="https://colloc2019.wixsite.com/colloc2019/about-the-workshop">https://colloc2019.wixsite.com/colloc2019/about-the-workshop</a>	
	RWTH Living lab. Reallabor Templergraben <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tokxn/Reallabor-Templergraben/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tokxn/Reallabor-Templergraben/</a>	<b>UPV On campus laboratory. UPV living lab</b> <a href="https://www.upv.es/entidades/vcampus/en/en-living-lab/">https://www.upv.es/entidades/vcampus/en/en-living-lab/</a>	
	<b>RWTH Living lab. Reallabor Theaterplatz</b> <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tolhr/Reallabor-Theaterplatz/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tolhr/Reallabor-Theaterplatz/</a>		
	RWTH Network (attempt to institutionalise urban transformation platform). KlimaNetze 2.0 <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Liste-der-Living-Labs/~rtwus/KlimaNetze/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Liste-der-Living-Labs/~rtwus/KlimaNetze/</a>		
	RWTH Living Lab for the energy turn. SmartQuart <a href="https://smartquart.energy/">https://smartquart.energy/</a>		
<b>05 Master courses / programmes / projects</b>			
		<b>POLIMI University hubs in city of Milan, initiative in Polisocial programme. Social engagement partnerships, teaching, research and co-design with communities. OFF CAMPUS</b>	TUB Courses, design studios, study formats with social engagement. MASTER COURSES IN URBAN PLANNING, ARCHITECTURE, LANDSCAPE ARCHITECTURE, URBAN DESIGN <a href="https://www.tu.berlin/en/staedtebau">https://www.tu.berlin/en/staedtebau</a>

		<a href="http://www.polisocial.polimi.it/it/off-campus/">http://www.polisocial.polimi.it/it/off-campus/</a>	<a href="https://fg.freiraum.tu-berlin.de/en/aktuelles/">https://fg.freiraum.tu-berlin.de/en/aktuelles/</a> <a href="https://www.tu.berlin/en/science-and-society/projects-and-research">https://www.tu.berlin/en/science-and-society/projects-and-research</a> <a href="https://habitat-unit.de/">https://habitat-unit.de/</a> <a href="https://www.nbl.berlin/circles/natural-building-lab/">https://www.nbl.berlin/circles/natural-building-lab/</a>
			RWTH Project in MSc Architecture and MSc Urban Planning. BÜCHEL:LAB <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tosme/Buechel-Lab/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tosme/Buechel-Lab/</a>
			<b>RWTH Educational project. LEONARDO</b> <a href="https://www.leonardo.rwth-aachen.de/en/homepage/">https://www.leonardo.rwth-aachen.de/en/homepage/</a>
			<b>CHALMERS Educational initiative individual study + collaboration, between different programmes, elective courses.</b> <b>TRACKS educational initiative</b> <a href="https://www.chalmers.se/en/education/study-at-chalmers/why-chalmers/tracks-a-unique-educational-initiative/">https://www.chalmers.se/en/education/study-at-chalmers/why-chalmers/tracks-a-unique-educational-initiative/</a>
			<b>CHALMERS Collaboration between architects and engineers working on a project in partnership (e.g. Gothenburg City).</b> <b>MASTER'S COURSE Dare 2 Build</b> <a href="https://play.chalmers.se/media/Parkourius+2021+-+Forest+Parkour/0_ccc4325w">https://play.chalmers.se/media/Parkourius+2021+-+Forest+Parkour/0_ccc4325w</a>
			CHALMERS Real projects in partnership with stakeholders MASTERS's COURSE Design and planning , <a href="https://research.chalmers.se/publication/511204/file/511204_Fulltext.pdf">https://research.chalmers.se/publication/511204/file/511204_Fulltext.pdf</a> <a href="https://www.chalmers.se/en/departments/ace/research/urban-design-and-planning/">https://www.chalmers.se/en/departments/ace/research/urban-design-and-planning/</a> DOI: 10.13140/RG.2.2.20433.97125 DOI: 10.1007/978-3-319-33527-8_9

Table 02 Mapped project-driven transdisciplinary initiatives (research + education) (magenta = selected as ENHANCE good practice) @ ENHANCERIA WP3 working group 2024

### 9.3 DISCUSSION

Some results can be taken from the two tables:

- There were **51 strategy-driven transdisciplinary initiatives** were mapped; 15 of them are identified as **ENHANCE good practices** and marked in orange (2 of them are listed twice because of different representations).
- **Project-led transdisciplinary initiatives** related to research and education in total **49 cases** have been identified. So far **12** of them are characterised as **ENHANCE good practice** so far. More projects could be identified when further in-depth research has undertaken.
- Mirroring the scientific literature about the institutionalisation of transdisciplinarity, the mapping resulted in seven types of strategy-driven initiatives and five types of research and education-based **project-driven initiatives** (see above). This categorisation has been made by each WP member of the ENHANCERIA working group. It shows the broad range of possible opportunities for institutionalisation and represents the interaction between different levels and dimensions regarding the macro-, meso-, and micro level (Baptista and Klein 2022, Williams et al. 2024, p 5, Wieck et al. 2025 foreseen), the key dimensions of institutionalisation identified from Williams et. al. 2024 and on different institutional levels (Leurs et al. 2023). The tables 1 and 2 ‘Tools from selected transdisciplinary strategies’ and ‘Tools from selected transdisciplinary projects’) formulate the linkage to certain levels and dimensions from the literature more specifically (see Appendix).
- All identified strategic cases are dependent on university governance structures and influenced by external factors on regional, national and international level (see [D3.2 Catalogue of Joint Advisory for supporting transdisciplinary research](#)).
- The most mapped cases are labs, (research) projects and living labs. Due to different alignments, objectives and structural positioning at the ENHANCE universities they can be listed in the category of ‘Project-driven transdisciplinary initiatives’ and a few in ‘Strategy-driven transdisciplinary initiatives’.
- It can be stated that most of all the living labs as experimentation space stimulating societal transformation are a catalysing format also on the strategic dimension of university beyond research programmes and Alliances.
- The types of initiatives make visible that they group transdisciplinary initiatives with high capability and relevance for stimulating linkages between university structures and projects. This can be via topics (smart city or climate adaptive urban development), cooperations, levels of engagement, methods of testing, knowledge integration, networking, reflection, evaluation). The format of the living labs, specific platforms and hubs and strategic units with centralised services belong to this category.

### 9.4 EXTRACTED TOOLS FOR INSTITUTIONALISATION OF TRANSDISCIPLINARITY IN THE ENHANCE ALLIANCE

More in-depth research was undertaken and discussion among the ENHANCE partner to extract tools in terms of formats, ways of working and methodologic approaches for set up of processes, building teams, creating models (for funding, for publication, for knowledge integration, for science communication e.g.). In total they represent specific and concrete operational tools from the ENHANCE partner universities for going beyond the normative and traditional university structures, for stimulating linkages, for experimenting new ways of collaborating with society. They are characterized as ‘possibly transferable’ because of their catalysing character and as stimulating ideas for enabling long-term knowledge exchange between science and society and as test models. Nevertheless, more in-depth analysis is needed to understand the framing universities conditions, facilitating and hindering factors and to evaluate the transferability. In this document, they are represented twice: listed in general and as graphic (Figure 03) with an overview and categorized in relation to the type of initiative. More detailed information of the tools extracted from the ENHANCE good practices are additionally shown in the two

tables in the appendix (appendix 1 tools from good practice strategies, appendix 2 tools from good practice projects).

#### // TOOLS FROM ENHANCE GOOD PRACTICE STRATEGIES (see Appendix 1)

- Set up of an innovative pilot project (joint university-city project) for a long-term cooperation model to a more holistic approach to education, research and innovation (NTNU)
- University agenda setting through the formulation of university mission, main goals and objectives on different levels supporting to create university structures and framework conditions and responding to the needs of society (UPV)
- Centralised structural establishment (office for science and society) for the institutionalisation of transdisciplinary research for consulting, building partnerships, developing, testing and building pilots (TUB)
- Inter- and transdisciplinary agenda-setting and cooperation model through support for different research initiatives on inter- and transdisciplinarity (RWTH)
- Built up an acceleration framework (operational and development support, including fundraising) (WUT)
- Prototype development through co-design and co-creation in partnerships with companies and through joint research, innovation and education activities (CHALMERS)
- Fostering research, education and social engagement through a programme line and funding related to the OFF Campus university project (aiming to activate innovation-through-proximity processes in Milan) (POLIMI)
- Set up of participation model, knowledge exchange, mapping, evaluation, transfer of living labs (RWTH)
- Set up of transformation ecosystem for living labs, process-development and cooperation model through linking of scientific questions, methods, data, actors and providing circular exchange (TUB)
- Set up of dialogue-oriented processes for structural change aiming to create collaborative structures for the model Rhenish Region (RTWH)
- Prototype development from student project to a central experimental platform + communication model including dissemination activities, tours, scientific conferences, publications (NTNU)
- Set up of transformation alliances for campus development by spatial experimentation and implementations on transformation knowledge (climate-adaptation measures) (TUB)
- Set up of a living lab experimentation format in cooperation with business partners and with tenants (CHALMERS)
- Set up of a makerspace with 4 pillars of activities: competitive research, consultancy with stakeholders, preincubations of talents and cultural initiatives (POLIMI)

#### // TOOLS FROM ENHANCE GOOD PRACTICE PROJECTS (RESEARCH AND EDUCATION) (see Appendix 2)

- Built up of long-term funding model as part of the Norwegian Research Council's scheme for long term research (NTNU research)
- Creating a cookbook – as model for publication and representation of transdisciplinary topic-related activities and formats like pilots, living labs (NTNU research, innovation and education)
- Research project development in collaboration of research teams and with consultation, innovation technicians will look for partners (UPV research)
- Building of transdisciplinary research teams via collaborative action research workshops (UPV research, education)
- Set up of course-based cooperation model science and industries/public sector inclusive train-the-trainer programme addressing societal problems (NTNU education)
- Open science and society model (geodatabase platform) for virtual debates and information to society (WUT innovation, research)

- Science communication/dissemination model in cooperation with city which gives visibility to women in science (UPV research, strategy)
- Generation of a transformation process through experimentation and dialogue for future design of an urban space (RWTH research)
- Set up of test beds/sandboxes for campus development by creating an experimentation environment which will be replicable in the neighbourhoods of Valencia (UPV research, education)
- Development of a transdisciplinary Dual Design strategy and creation of common ground in workshops with communities by joint problem definition and collaborative planning, designing and building of problem solutions for housing, open space and infrastructures (TUB research, education)
- Set up of interdisciplinary teaching modules with workshops enabling interaction and interdisciplinary collaborations in smaller groups for social justice, rethinking resources, sustainability and transformation (RWTH education)
- Set up of interdisciplinary competencies under the framework of elective courses and through cooperation with industry and communities (CHALMERS education)
- Set up of parkour as playful training method and for promoting community creativity (CHALMERS education)

POSSIBLY TRANSFERABLE TOOLS FOR THE INSTITUTIONLIZATION OF TRANSDISCIPLINARITY



Figure 03 Compilation of extracted tools from ENHANCE good practice strategies and projects (research + education) @ Kathrin Wieck 2024

The diagram gives an overview of the tools extracted from ENHANCE good practice strategies and projects (research and education). It also represents the connections and synergies existing between the more strategic processes of supporting transdisciplinary activities and processes as outcome of certain

projects. Most prominent for linking strategic and project objectives here are the **Living labs** as an experimentation format of transformative research. Through living labs socio-ecological transformation processes are initiated in a participatory and cooperative way and they also consolidate scientific and social learning processes. With a perspective to exploring methods and tools of the institutionalisation of transdisciplinarity they have been characterized as both: strategic initiatives e.g. for prototype developments, the building of transformation alliances and as experimentation format and also as project initiatives, e.g. initiating transformation processes and dialogues, set up of testbeds for knowledge and technology transfer and the development of transdisciplinary design strategies. The interaction between the strategic university governance level and the individual and specific level of projects are also visible in the other examples. The tools from ENHANCE good practice strategies are functions for building frameworks for enabling more permanent transdisciplinary research processes, long-term cooperations between science and society and for replicable practices of knowledge exchange. On the other hand, the tools from ENHANCE good practice projects are not single projects with specific research (and education) topics. They also contain methodologic set ups for stimulating replicable processes, impacts and outcomes of transdisciplinary work and for stimulating long-term cooperations. Together, the extracted tools for the institutionalisation of transdisciplinarity in the ENHANCE Alliance form an arena for raising awareness, stimulating ideas for testing of tools (partially) and for future discussion of this topic in the Alliance.

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## // PART IV CONCLUSIONS & OUTLOOK

### 10. CONCLUSIONS AND OUTLOOK

As previously introduced in the catalogue of advisory supporting transdisciplinary research (see XXX) and more detailed and differentiated in this document our aim is to explore and develop methodologic approaches for the gradual institutionalisation of knowledge exchange between science and society within the ENHANCE Alliance. We understand the institutionalisation of transdisciplinarity as institutional transformation for better promoting, enabling and accompanying transdisciplinary research for sustainable development at the member universities and beyond. By considering the challenges, hindering and the facilitating factors for developing strategies and structures which are very divers existing in the ENHANCE universities we further mapped good practice examples, investigated them for extracting tools and furthermore set up joint tools. Together this forms the knowledge base with recommendations for future common transdisciplinary activities (in the ENHANCE+ project and beyond in other Alliances).

Connected to significant key literature (Williams et al, 2024, p 5, Leurs et al. 2024, Dedeurwaerdere 2024, Baptista and Klein 2022, Bammer 2020, Wieck et al. 2025 foreseen, see all in Chapter I.2) these recommendations for a transformation toolbox (for institutionalising transdisciplinary work in the universities policy dimensions of strategy, research and education including innovation) contain the development of tools which are necessary to initiate transdisciplinary projects in a more targeted manner and support them in an advisory capacity, link them into research and teaching and establish long-term collaborations between research and society. The ENHANCE Alliance has achieved this through a framing as an integrative process for developing a mutual learning environment among the ENHANCE Alliance to welcome all approaches equally and be open minded to their respective advantages. This process is part of the institutional transformation (or institutionalisation) for transdisciplinarity to raise more awareness in the sphere of policy, funding and programme lines, reward culture, career development, and in research and education practice. The mutual learning environment was developed step-by-step: by integrating different levels of experience with transdisciplinarity, by developing a joint knowledge base, and by generating recommendations for institutional change with this document. Based on a shared understanding on transdisciplinarity for a common goal and shared language among the ENHANCE universities as well as by sharing good practices the transformation toolbox is to be understood as a compilation of new joint developed tools and selected formats from ENHANCE Good practices for emerging questions towards institutional transformation.

Considering that systematic approaches for developing methodologic approaches providing institutional transformation for better supporting transdisciplinary at universities are still limited this transformation toolbox represents a testing pilot for creating a pathway. Together, the transformation tools as both ENHANCE jointly developed formats and extracted tools from ENHANCE good practices represent a broad scope of possibilities stimulating change in various steps. This ranges from raising more awareness in the university policies and faculty research and education practices, to formulate policy and strategy papers, to experiment and test certain tools (e.g. living labs for campus development) to engaging for joint funding proposals and therefore implementing pilot projects as testbeds. Joint transdisciplinary projects as transformation labs regarding climate adaptive smart city development are already on the agenda in the ENHANCE+ project in work package 'Transdisciplinary lab for societal transformation'. Furthermore, we investigated, valued and highlighted certain ENHANCE good practice examples of transdisciplinarity of each ENHANCE university which shows innovative and creative linkages between enabling strategic approaches and productive transdisciplinary projects, formats and practices (mostly in the form of living labs). In summary, they represent a broad range of possibilities stimulating change and creating arenas of transformation between strategy and practice: through university agenda setting, set up of participation, engagement, cooperation and transformation alliances models, development of living lab experimentation model, creation of dissemination and publication model, developing design strategies, stimulating

transformation processes by experimentation and labs among others. They also represent relations to different university outreach like strategic projects, science communication, knowledge (and technology) transfer, strategic partnerships. In a next step and project (e.g. ENHANCE+) these recommendations can be used for setting up of testing transdisciplinary labs to reflect and evaluate practical challenges, facilities and barriers for a long-term implementation at the ENHANCE universities.

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**// PART V APPENDIX: 12. APPENDIX 1 TOOLS FROM GOOD PRACTICE STRATEGIES** D3.4 ENHANCERIA WP3 MAPPED TRANSDISCIPLINARY INITIATIVES

DIMENSION / LITERATURE	TD INITIATIVE / ENHANCE UNIVERSITY	MAIN CHARACTERISTICS / METHODOLOGY	EXTRACTED FORMATS / METHODS / TOOLS
01 Strategic research areas		Promote innovative thinking, long-term vision and addresses complex societal challenges	
<p><b>STRATEGY + RESEARCH / EDUCATION</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p> <p>Macro-level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Organisational value (Willimas et. al., 2024)</p>	<p><b>Long term cooperation. UNIVERSITYCITY TRD3.0 NTNU + TRONDHEIM</b></p> <p><a href="https://i.ntnu.no/wiki/-/wiki/Norsk/Universitetskommune">https://i.ntnu.no/wiki/-/wiki/Norsk/Universitetskommune</a></p>	<ul style="list-style-type: none"> <li>- Partnership agreement to jointly develop a University City (since 2018)</li> <li>- A national pilot based on five thematic focus areas; Education and Early development, Health and Welfare, Urban development, Innovation and Smart City</li> <li>- project-organized, with a duration of a total of eight years, which builds on a long-term collaboration between Trondheim municipality and NTNU</li> </ul>	<p><b>Set up of an innovative pilot project for a long-term cooperation model</b></p> <ul style="list-style-type: none"> <li>- moving the collaboration "one step up" towards a more holistic approach to education, research and innovation through the joint university – city project</li> <li>- Building stone to develop a model for innovation and restructuring in the public sector through research, innovation, education and participation in development projects of strategic importance to the public sector.</li> <li>- Document the model through research-based evaluation</li> </ul>
02 Institutional strategy/Strategic plan/university guidelines		Setting of core strategic guidelines, defines strategic goals, values and fields of action	
<p><b>STRATEGY</b></p> <p>University level (Leurs et al., 2023)</p>	<p><b>UPV SIRVE</b></p> <p><a href="https://www.upv.es/contenidos/upv_sirve/en/home/">https://www.upv.es/contenidos/upv_sirve/en/home/</a></p>	<ul style="list-style-type: none"> <li>- a strategic plan for 2023 to 2027 with five strategic goals (sustainable, international, relevant, vital, excellent) to be achieved through 16 strategic objectives</li> </ul>	<p><b>University agenda setting through formulation of universities mission, main goals and objectives on different levels</b></p>

<p>Macro-level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Organisational value (Willimas et. al., 2024, 7-8)</p>		<ul style="list-style-type: none"> <li>- The strategy seeks to achieve carbon neutrality by 2030, seeks to promote TD collaboration as part of its vision, and has sustainability as one of its 5 goals</li> <li>- Includes plans and programs approved at the Strategie Development Committee (SDC), among others: <b>UPV Sustainable goal</b>, to position the UPV so that its three campuses achieve carbon neutrality by 2030, <b>UPV-International, UPV-relevant</b> to e.g. consolidate the reputation and leadership of the UPV in social transformation; to foster the transdisciplinary nature of research, innovation and transfer activities, promoting their permeability towards teaching; <b>UPV-Excellent, UPV-Vital</b></li> </ul>	<ul style="list-style-type: none"> <li>- support to create internal university structures and framework conditions that allow further extension of academic cooperation and networked research at the highest level</li> <li>- Responding to the needs of society</li> <li>- Includes diverse programmes on infrastructure, energy efficiency, living labs, source of fundings, international exchange programmes, promotion</li> <li>- Strengthen alliances</li> <li>- Impacts on knowledge production</li> <li>- Consolidate reputation and leadership</li> <li>- To foster research, innovation and transfer activities through teaching</li> </ul>
<p>03 Strategic unit/facility</p>		<p>Specific strategic units at universities represent areas of special strategic importance</p>	
<p><b>STRATEGY</b></p> <p>University level (Leurs et al., 2023)</p> <p>Connects macro- and micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p>	<p><b>TUB Central OFFICE FOR SCIENCE AND SOCIETY</b>  <a href="https://www.tu.berlin/science-and-society">https://www.tu.berlin/science-and-society</a></p>	<ul style="list-style-type: none"> <li>- strategic and operative work to systematically develop new ways of knowledge exchange at the TU Berlin in cooperation with science communication and knowledge and technology</li> <li>- developing strategic goals implementing pilot projects with high value for TUB</li> <li>- linking existing transdisciplinary projects, centres and services by providing an innovation ecosystem (connecting top-down and bottom-up levels)</li> </ul>	<p><b>Centralised structural establishment for the institutionalisation of transdisciplinary research</b></p> <ul style="list-style-type: none"> <li>- including consulting + building inter- and transdisciplinary partnerships/cooperations + developing and testing of pilot projects</li> <li>- central unit and knowledge base providing knowledge exchange of science and society on various levels and by hosting various platforms, services and transdisciplinary projects of TU Berlin</li> </ul>

<p>organizational structure + leadership (Williams et. al., 2024, 7-8)</p>			<ul style="list-style-type: none"> <li>- accumulating TU services of support on transdisciplinarity, matchmaking and long term cooperations between science and society and process development for institutionlisation of transdisciplinarity</li> </ul>
<p>04 Funding Scheme/ Programme (diverse levels)</p>		<p>Funding scheme for business models, strategic ecosystem partnerships</p>	
<p><b>STRATEGY</b></p> <p>University level (Leurs et al., 2023)</p> <p>Connects macro- and micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + funding (Williams et. al., 2024, 7-8)</p>	<p><b>RWTH Excellence Initiative, LIVING LAB INCUBATOR</b></p> <p><a href="https://www.rwth-aachen.de/cms/root/Die-RWTH/Exzellenzinitiative/~eob/Exzellenzinitiative/?lidx=1">https://www.rwth-aachen.de/cms/root/Die-RWTH/Exzellenzinitiative/~eob/Exzellenzinitiative/?lidx=1</a></p>	<ul style="list-style-type: none"> <li>- structure building under the framework of measurement 5 „Collaborate in Living Labs“ in Excellence strategy (2019-2026)</li> <li>- supports interdisciplinary collaboration and transdisciplinary approaches to knowledge and value creation at the core of the RWTH's aim to become an Integrated Interdisciplinary University for Science and Technology</li> <li>-</li> </ul>	<p><b>Inter- and transdisciplinary agenda-setting and cooperation model</b></p> <ul style="list-style-type: none"> <li>- support for different research initiatives on inter- and transdisciplinarity</li> <li>- specialised in networking, accompanying research and research-related teaching on the subject of real-world laboratories</li> </ul>
<p><b>STRATEGY- EDUCATION-</b></p> <p>University level (Leurs et al., 2023)</p>	<p><b>WUT Programme. Broad business model programme WUT ACCELERATOR</b></p> <p><a href="https://cziitt.pw.edu.pl/dla-pracownikow-pw/przedsiębiorczosc-">https://cziitt.pw.edu.pl/dla-pracownikow-pw/przedsiębiorczosc-</a></p>	<ul style="list-style-type: none"> <li>- to support the initiation, incubation, and acceleration of start-up companies, which are created as a result of scientific and research activities of WUT employees and students and operate in their environment in the spin-off or spin-out formula</li> </ul>	<p><b>Built up an acceleration framework, (operational and development support, including fundraising) through:</b></p> <ul style="list-style-type: none"> <li>- acceleration programme,</li> <li>- acceleration process,</li> <li>- mentors network</li> </ul>

<p>Connects macro- and micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>organizational structure + funding(Williams et. al., 2024, 7-8)</p>	<p><a href="https://www.startupy-oraz-spolki-spin-off-i-spin-out/akcelerator-pw/">startupy-oraz-spolki-spin-off-i-spin-out/akcelerator-pw/</a></p>	<ul style="list-style-type: none"> <li>- looking for project teams that want to create companies based on technology commercialisation and that technology should be at the centre of that business model (could be an outcome of student projects)</li> <li>- to increase the readiness of business teams in three dimensions:             <ol style="list-style-type: none"> <li>1. market readiness, understood as increasing the supported business teams' awareness of customers, competition, possible business models, etc.;</li> <li>2. Team readiness - understood as increasing the level of organisation of supported business teams in the area of management, go-to-market market schedules, business modelling etc.;</li> <li>3. Formal readiness - understood as building a spin-off/spin-out company model of functioning with other stakeholders.</li> </ol> </li> </ul>	
<p><b>STRATEGY, RESEARCH, INNOVATION</b></p> <p>University level (Leurs et al., 2023)</p> <p>Macro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck</p>	<p><b>CHALMERS Strategic thematic platforms, AREAS OF ADVANCE</b></p> <p><a href="https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/">https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/</a></p>	<ul style="list-style-type: none"> <li>- 7 thematic areas platforms for strategy and long-term collaboration (Energy, ICT, Health Engineering, Material Sciences, Nanotechnology, Production and Transport).</li> <li>- Funding to initiate research projects, educational activities and other initiatives, e.g., with external partners</li> <li>- often directly relevant to industry and society, offer common access to cutting-edge research infrastructures and several targeted centres</li> </ul>	<p><b>Prototype-development</b></p> <ul style="list-style-type: none"> <li>- co-design, co-creation of prototypes,</li> <li>- pilots for research-based partnerships with companies</li> <li>- joint (transdisciplinary) projects on research and innovation,</li> <li>- joint educational activities</li> </ul>

<p>et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + funding (Williams et. al., 2024, 7-8)</p>		<ul style="list-style-type: none"> <li>- research-based partnerships with companies.</li> <li>- informing (hosting competence centres), collaborating (strategic partners involved in developing new courses), signed partnership agreements</li> <li>- hosting the competence centres and the strategic partners.</li> <li>- Representatives from the strategic partners might be involved in developing new courses and the strategic research agenda.</li> </ul>	
<p><b>STRATEGY (RESEARCH, EDUCATION)</b></p> <p>University level + project-level (Leurs et al., 2023)</p> <p>Macro + micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + funding + training (Williams et. al., 2024, 7-8)</p>	<p><b>POLISOCIAL PROGRAMME + OFF CAMPUS (University hubs in the city) + POLISOCIAL AWARD</b></p> <p><a href="http://www.polisocial.polimi.it/it/off-campus/">http://www.polisocial.polimi.it/it/off-campus/</a></p> <p><a href="https://www.polimi.it/en/sustainable-development/polisocial-award">https://www.polimi.it/en/sustainable-development/polisocial-award</a></p>	<p>Social engagement partnerships, teaching, research and co-design with communities (part of POLISOCIAL) - Polisocial is an academic social responsibility programme launched in 2012</p> <ul style="list-style-type: none"> <li>- POLISOCIAL programme launched in 2012 at POLIMI, aimed at expanding the university’s mission to include societal issues and needs that arise at both a local and global level</li> <li>- to create new areas of expertise</li> <li>- training professionals and researchers capable of producing social change and contributing responsibly to the communities in which they operate</li> <li>-</li> <li>- promotes and encourages a new multidisciplinary approach to projects in the university, including through the Off Campus initiative, whereby university hubs are established in the city of Milan to facilitate the joint development of innovative teaching activities, in collaboration with local</li> </ul>	<p><b>Fostering research, education and social engagement through a programme line and funding</b></p> <ul style="list-style-type: none"> <li>- The 2024 edition is dedicated to “Proximity and Innovation” and is designed in close relationship with the OFF CAMPUS University project, with the aim of activating innovation-through-proximity processes in the city of Milan</li> <li>- co-research and co-design paths through the construction of long-lasting alliances between the University, local actors and other stakeholders</li> <li>- <b>two funding lines:</b> activation of new research projects; consolidation of existing research projects connected with the Off Campus initiative.</li> </ul>

		<p>communities University hubs are established in the city of Milan to facilitate the joint development of innovative research, teaching and social responsibility activities, in collaboration with local communities</p> <ul style="list-style-type: none"> <li>- Partners implement and strengthen own activities in collaboration with Polimi</li> <li>- Polimi researchers from the involved Departments develop innovative research projects (community-based, living labs)</li> </ul>	
05 Strategic cooperation model / Partnerships/alliances		organizational formation to achieve organizational objectives better through collaboration	
<p><b>STRATEGY</b></p> <p>University level (Leurs et al., 2023)</p> <p>Connects macro- and micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + funding (Williams et. al., 2024, 7-8)</p>	<p><b>RWTH Living lab incubator</b>  <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~mgveq/Living-Labs-Incubator/?lidx=1">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/~mgveq/Living-Labs-Incubator/?lidx=1</a></p>	<ul style="list-style-type: none"> <li>- collects information on projects and institutions to support networking and exchange experience.</li> <li>- developing indicators for characterising transdisciplinary knowledge production and evaluation in and through real-world labs (RWL) and testing them in participatory</li> </ul>	<p><b>Set-up of participation model, knowledge exchange, mapping, evaluation, transfer of living labs</b></p> <ul style="list-style-type: none"> <li>- providing knowledge production and experimentation,</li> <li>- providing research, methods, information,</li> <li>- through living labs and innovation ecosystems stimulates topic-specific or method-specific collaborations and innovation</li> </ul>

06 (Strategic) Platforms/Hubs		Space for knowledge exchange, distribution of ideas, networking	
<p><b>STRATEGY, RESEARCH</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p> <p>Connects macro- and micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>TUB Strategic platform living labs. STADTMANUFAKTUR</b>  <a href="https://stadtmanufaktur.info/en/">https://stadtmanufaktur.info/en/</a></p>	<ul style="list-style-type: none"> <li>- providing, testing and evaluating social transformations, transformation research and transformation knowledge</li> <li>- role of co-producers and co-production</li> <li>- Focus on sustainable development and urban transformation (e.g. focus areas: Energy and mobility transition, Climate resilience, transformation knowledge, circular economy)</li> <li>- Joint development of concepts and strategies by relevant solutions applied directly in urban areas</li> <li>- developing of pilot projects, cooperation between TU Berlin and city administration (e.g. ClimateHood)</li> </ul>	<p><b>Set up of transformation ecosystem, process-development and cooperation model</b> through</p> <ul style="list-style-type: none"> <li>- matches scientific questions, methods, tactics and data with practical know-how and actors</li> <li>- bundling of existing living labs in Berlin,</li> <li>- providing circular exchange between science and society</li> <li>- Long-term partnerships for complex urban transformation processes</li> <li>- Transdisciplinary research and implementation through cooperation between science, business, civil society and politics</li> <li>- Transformation knowledge in dealing with city administration stakeholders, long-term monitoring of projects and opening up experimental spaces</li> <li>- Utilizing and implementing findings and innovations from science and real-world laboratory work for complex urban challenges</li> <li>- Cross-linking the transformation topics</li> </ul>
<p><b>STRATEGY</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p>	<p><b>RWTH PLATFORM on structural change REVIERa</b>  <a href="https://www.reviera.rwth-aachen.de/cms/~ogiy/reviera/?lidx=1">https://www.reviera.rwth-aachen.de/cms/~ogiy/reviera/?lidx=1</a></p>	<ul style="list-style-type: none"> <li>- Platform for structural change for knowledge exchange and collaboration among stakeholders in the Rhenish Region</li> <li>- works across faculties and disciplines on the long-term perspectives of structural change in the Rhenish mining area</li> </ul>	<p><b>Set-up of dialogue-oriented processes for regional structural change</b>, providing a new culture of knowledge, innovation and communication, aiming to create <b>collaborative structures for the model region</b> for the medium and the long term</p>

<p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>		<ul style="list-style-type: none"> <li>- Various methods and formats to enhance multi-lateral communication and collaboration, Formats facilitating ongoing dialogue between all groups and stakeholders involved in and affected by the transformation</li> <li>- Provide impetus for innovation (seven fields of innovation) in the Rhenish mining area to help shape the socio-ecological transformation towards sustainability together with a wide range of stakeholder groups in the region</li> </ul>	<ul style="list-style-type: none"> <li>- co-create and test methods and formats of exchange to shape and master the highly interconnected transformation activities</li> <li>- e.g. the tu! Hambach (temporary university Hambach, i.e. several days of lectures, workshops, exhibitions, etc. right at the edge of an open lignite mine); or the "future synthesizer" method to collect and structure impulses from various stakeholders towards a shared desired goal</li> <li>-</li> </ul>
<p>University level (Leurs et al., 2023)</p> <p>Macro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + funding (Williams et. al., 2024, 7-8)</p>	<p><b>CHALMERS Strategic thematic platforms, AREAS OF ADVANCE</b> <a href="https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/">https://www.chalmers.se/en/collaborate-with-us/collaborate-in-research-and-innovation/</a></p>	<p>See above</p>	

07 Laboratory/Labs/Network/Strategic Projects		for the pooling of research potential and design methods with participatory approaches to science and innovation, e.g. also workshop spaces (Living labs, FabLabs) in which people work collaboratively or sharing resources	
<p><b>STRATEGY, EDUCATION</b></p> <p>Project level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>NTNU 1 of 9 Digital Transformation Initiative. AUTOFERRY PROJECT</b></p> <p><a href="https://www.ntnu.edu/autoferry">https://www.ntnu.edu/autoferry</a></p>	<ul style="list-style-type: none"> <li>- aims to develop new concepts and methods that will enable the development of small autonomous passenger ferries for urban water transport technology <i>spin-off Zeabuz</i> was founded by the university faculty involved in the project and now has 25-30 employees</li> <li>- collaboration between societal initiative on individual level (Veteran Boat society), Business (when it comes to the commercialisation and scalability of the project), Trondheim Harbour Authority, Trondheim Municipality and the University City TRD3.0 as partners</li> </ul>	<p><b>Prototype development from student project to a main experimental platform + communication model</b></p> <ul style="list-style-type: none"> <li>- In 2022 approximately 100 <b>dissemination activities and tours</b> were given to guests and visitors, ranging from students to government ministers and royals.</li> <li>- results are communicated through a range of <b>channels, such as popular science conferences, Op-eds, scientific publications and other media.</b></li> <li>- <b>Transfer:</b> the concept, based on technology from a NTNU spinoff is now operational in Stockholm, Sweden: MF Estelle.</li> </ul>
<p><b>RESEARCH, STRATEGY</b></p> <p>University level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p>	<p><b>TUB Living lab Campus Park. CLIMATEHOOD</b></p> <p><a href="https://stadtmanufaktur.info/en/living-labs/climatehood-campuspark-charlottenburg/CLIMATEHOOD">https://stadtmanufaktur.info/en/living-labs/climatehood-campuspark-charlottenburg/CLIMATEHOOD</a></p>	<ul style="list-style-type: none"> <li>- Model partnership ClimateHOOD between urban and university stakeholders (District Administration Charlottenburg, TU Berlin and UdK, WerkStadtForum Charlottenburg)</li> <li>- Climate-relevant open space development is interlinked with research and teaching as a real laboratory in the urban space, ClimateLABs on the campus, in the neighborhood</li> <li>- Innovative management and operator models are conceptually developed and</li> </ul>	<p><b>Set up of transformation alliances for campus development by spatial experimentation and implementations on transformation knowledge (climate-adaptation measures)</b></p> <ul style="list-style-type: none"> <li>- Building measures to design a climate-neutral campus as a real-world laboratory</li> <li>- Long-term partnerships for complex urban transformation processes</li> <li>- Co-production of knowledge with citizens, other partners and stakeholders</li> </ul>

<p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>		<p>tested with the transdisciplinary stakeholder networks involved Climate_ALLIANCES</p>	<ul style="list-style-type: none"> <li>- Transformation knowledge in dealing with city administration stakeholders, long-term monitoring of projects and opening up experimental spaces</li> <li>- Utilizing and implementing findings and innovations from science and real-world laboratory work for complex urban challenges</li> </ul>
<p><b>RESEARCH, STRATEGY</b></p> <p>University and Interdepartmental level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>CHALMERS Living lab in cooperation with companies from the building industry. HSB LIVING LABS</b>  <a href="https://www.chalmers.se/en/areas-of-advance/energy/joint_initiatives/HSB-Living-Lab/Pages/default.aspx">https://www.chalmers.se/en/areas-of-advance/energy/joint_initiatives/HSB-Living-Lab/Pages/default.aspx</a></p>	<ul style="list-style-type: none"> <li>- arena where new ways were developed to build and shape the housing of the future.</li> <li>- Cooperation with a range of companies covering the entire building industry (engineering, building, product supply, energy suppliers</li> <li>- Research projects on sustainable living</li> <li>- Concrete products (e.g. low-energy refreshing cabinet from Electrolux),</li> <li>- Prototyping: some start-up company testing products (prototyping) e.g. testing materials for facades</li> <li>- Behavioural analysis e.g. on energy consumption</li> </ul>	<p><b>Set up of a living lab experimentation format in cooperation with business partners and with tenants</b></p> <ul style="list-style-type: none"> <li>- Research with tenants of the house, live in a constantly changing and evaluated environment, all while the research is ongoing</li> </ul>

<p><b>RESEARCH, STRATEGY</b></p> <p>University and Interdepartmental level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>POLIMI Interdepartmental Research Lab / University Makerspace.</b></p> <p><b>POLIFACTORY</b></p> <p><a href="mailto:polifactory@polimi.it">polifactory@polimi.it</a></p>	<ul style="list-style-type: none"> <li>- explores the relationship between design and new digital manufacturing processes,</li> <li>- investigate the possible future manufacturing scenarios: distributed design and production models, urban scale manufacturing, design and prototyping of smart product-service systems, and open design and hardware of technical systems,</li> <li>- Polifactory has been created hybridising a formal academic model of Transdisciplinarity (a top-down, multidisciplinary group made by designers and engineers (mechanics, computer science, ...) with an informal transdisciplinary network provided by a grassroots movement (Makers Movement and Fab Lab Networks, community-based on transdisciplinary collaboration, connected to STEM culture, to open and citizen science)</li> </ul>	<p><b>Set up of a makerspace with 4 pillars of activities</b></p> <ul style="list-style-type: none"> <li>- 1) competitive research; we can collaborate with public and private stakeholders in this field.</li> <li>- 2) consultancy with local, national and international stakeholders such as large-scale companies, SMEs, foundations and various associations.</li> <li>- 3) preincubation of talents and ideas.</li> <li>- 4) concerns cultural initiatives.</li> </ul>
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DIMENSION / LITERATURE	TD INITIATIVE ENHANCE UNIVERSITY	MAIN CHARACTERISTICS / METHODOLOGY	EXTRACTED FORMATS / METHODS / TOOLS
01 Research center / Knowledge cluster		Research center for doing research, disciplinary, interdisciplinary and transdisciplinary, knowledge cluster are local innovation systems with high internal and external networking and knowledge sharing capabilities	
<p><b>RESEARCH</b></p> <p>University level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>NTNU NTRANS (FME) research center conducts research on the role of energy system in the transition to zero-emission society</b></p> <p><a href="https://www.ntnu.no/ntrans">https://www.ntnu.no/ntrans</a></p>	<p>Research topics:</p> <ul style="list-style-type: none"> <li>- energy system in the decarbonization of sectors such as energy, transport, industry, and buildings, as well as our everyday lives.</li> <li>- New practices, increased citizen engagement, and changes in behaviour are vital in order to stimulate demand for low-carbon solutions, to create political legitimacy, and to mobilize the resources needed for the transition.</li> </ul> <p>Research focus:</p> <ul style="list-style-type: none"> <li>- How can the scope of the transition be widened to include citizens and their interaction with technologies and systems?</li> <li>- How can the scope of the transition be deepened (i.e. how can a fundamental society-wide change be implemented through the logics of production, distribution,</li> </ul>	<p><b>Long term funding model</b></p> <ul style="list-style-type: none"> <li>- The social science related FME research centre is part of the Norwegian Research Council's scheme for <b>long-term research</b></li> <li>- research at a high international standard, aiming to tackle energy-related challenge</li> </ul>

		<p>consumption, and coupling of economic sectors)? And</p> <ul style="list-style-type: none"> <li>- How can the transition be accelerated to achieve emission reductions at the intersection of energy, climate, and sustainability?</li> </ul>	
<p><b>RESEARCH, INNOVATION, EDUCATION</b></p> <p>Departmental and interdepartmental level (Leurs et al., 2023)</p> <p>Macro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>NTNU Cross-disciplinary knowledge cluster. SMART SUSTAINABLE CITIES Faculty of Architecture and Design Department of Architecture and Planning</b></p> <p><a href="https://www.ntnu.edu/smartcities">https://www.ntnu.edu/smartcities</a></p>	<ul style="list-style-type: none"> <li>- cross-disciplinary knowledge cluster of architects, planners, designers, artists, engineering, ICT, social and economic sciences</li> <li>- With urban living labs, public-private partnerships and integrated design thinking, the initiative supports cities in their ambition to truly become cities for people, cities of culture, green cities, digital cities and learning cities – in short, truly smart and sustainable.</li> <li>- NTNU is a partner of the European Commission's New European Bauhaus initiative</li> </ul>	<p><b>Cookbook – as model for publication and representation of transdisciplinary topic-related activities and formats like pilots, living labs</b></p> <ol style="list-style-type: none"> <li>1. How to PED. The +CityxChange Cookbook: Experiences and Guidelines on Positive Energy Districts (<a href="https://cityxchange.eu/knowledge-base/how-to-ped-cookbook/">https://cityxchange.eu/knowledge-base/how-to-ped-cookbook/</a>)</li> <li>2. The CrAFt Cookbook: A Recipe for Climate-Positive Cities and Communities (<a href="https://craft-cities.eu/craft-cookbook/">https://craft-cities.eu/craft-cookbook/</a>)</li> </ol> <ul style="list-style-type: none"> <li>- Content of the cookbooks are area-based initiatives for sustainability transformations in cross-sectoral collaborations, in-depth stakeholder involvement, innovation and experimentation</li> <li>- Pilots and urban living labs for long-term transformations in structures, cultures and practices, experiments for effective public participation</li> <li>- Cookbooks represent the involvement of stakeholders in</li> </ul>

			<p>decision-making and co-realisation for impactful solutions</p> <ul style="list-style-type: none"> <li>- First CrAft cookbook includes seven stages of development for New European Bauhaus from vision to implementation, documentation and replication</li> </ul>
02 Research programme / Research teams		Network of scientists and professionals, developing their programs of research, building interdisciplinary networks and working with decision-makers to maximize research impact	
<p><b>RESEARCH</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>UPV Research programme INBIO / POLISABIO (discontinued) / UNISALUT (the one that replaced it), Valencia universities + regional hospitals</b></p> <p><a href="https://www.inbio.es/">https://www.inbio.es/</a></p> <p><a href="https://www.polisabio.es/index.php/es/">https://www.polisabio.es/index.php/es/</a></p> <p><a href="https://unisalut.uji.es/">https://unisalut.uji.es/</a></p>	<p>Apart from INBIO, there used to be also the POLISABIO programme (UPV and regional hospitals), then converted into UNISALUT (all the universities from the Valencia region and regional hospitals).</p> <ul style="list-style-type: none"> <li>- Various initiatives with the aim of fostering alliances between researchers/professionals from these institutions and promoting the implementation of coordinated research or innovation projects leading to new biomedical technologies.</li> <li>- The UPV - HUP/IIS La Fe collaboration programme implements, through INBIO, different initiatives with the aim of fostering alliances between researchers/professionals from these institutions and promoting the implementation of coordinated research or innovation projects that</li> </ul>	<p><b>Research project development in collaboration of research teams</b></p> <ul style="list-style-type: none"> <li>- Ideas submitted by researchers and professionals from both institutions will be available for consultation</li> <li>- Once the new ideas have been validated and published, the innovation technicians of both entities will look for partners in the other institution and will contact them in order to form the team</li> <li>- Call for aid</li> </ul>

		give rise to new biomedical technologies.	
<p><b>RESEARCH, EDUCATION</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>UPV Research teams. Polimundus network</b></p> <p><b>ISALAB</b></p> <p><a href="https://headconf.org/wp-content/uploads/pdfs/8395.pdf">https://headconf.org/wp-content/uploads/pdfs/8395.pdf</a></p>	<ul style="list-style-type: none"> <li>- to create a collaborative network on transdisciplinary research, with a focus on ENHANCE key topics,</li> <li>- has launched two and three transdisciplinary projects coordinated with local stakeholders for joint MAster's thesis or PhDs-</li> <li>- the research teams project is co-designed by professors of different Universities and executed through the collaboration and co-creation of students/professors/supervisors</li> <li>- building interaction with stakeholders, society, and the environment</li> <li>- reflection on the results and the research process itself</li> <li>- the key result is the problem-solving actions</li> </ul>	<p><b>Building of transdisciplinary research teams</b></p> <ul style="list-style-type: none"> <li>- coordinates transdisciplinary research teams via collaborative action research workshops for transdisciplinary sustainability science,</li> <li>- joint research project-development and inter-and transdisciplinary research process with problem-solving</li> </ul>
<p><b>EDUCATION</b></p> <p>Course level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck</p>	<p><b>NTNU</b></p> <p><b>Cooperation model + education teams.</b></p> <p><b>EXPERTS IN TEAMWORK (EiT)</b></p> <p><a href="https://www.ntnu.edu/eit">https://www.ntnu.edu/eit</a></p>	<ul style="list-style-type: none"> <li>- A compulsory masters course that facilitates interdisciplinary student teams to work on real life challenges</li> <li>- interdisciplinary skills are taught in a practical setting via experience-based learning.</li> <li>- ongoing dialogue with partners (various industry and public sector) throughout the programme encourages students to consider</li> </ul>	<p><b>Set up of course-based cooperation model science and industries/public sector incl train-the trainer programme</b> which ensures addressing societal problems and experience-based learning</p> <ul style="list-style-type: none"> <li>- a whole system and framework to teach so many students each year</li> <li>- a book for teaching staff including exercises to support interdisciplinary collaboration,</li> </ul>

<p>et al. 2025 foreseen)</p> <p>Teaching and curriculum and training (Williams et. al., 2024, 7-8)</p>		<p>societal perspectives in their work, and external partners benefit from an interdisciplinary perspective on their project.</p> <ul style="list-style-type: none"> <li>- Many external partners have implemented the results from EiT projects in their businesses. Students also have to report on how the project contributes to society.</li> </ul>	<ul style="list-style-type: none"> <li>- train-the-trainer programme to prepare and train teaching staff for the upcoming teaching semester of the EiT course</li> <li>- raise the educators' competences on interdisciplinary collaboration.</li> </ul>
<p>03 Research projects/labs</p>		<p>Research on specific topics linked to practice and addressing societal problems in life world context</p>	
<p><b>INNOVATION, RESEARCH</b></p> <p>Project level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Organizational value and institutional culture (Williams et. al., 2024, 7-8)</p>	<p><b>WUT Project. DIGITAL AGORA PROJECT</b></p> <p><a href="https://www.sciencedirect.com/science/article/pii/S0264837721003379?via%3Dihub">https://www.sciencedirect.com/science/article/pii/S0264837721003379?via%3Dihub</a></p>	<p>The process of transforming spatial data into spatial knowledge using the Digital Agora conceptual model</p> <ul style="list-style-type: none"> <li>- The Digital Agora concept was applied both in Płock and Warsaw to define the problems of urban space development by the local community and to develop a concept of socially acceptable solutions using spatial data mining methods.</li> <li>- The analysis carried out in Płock and related to the concept of modernization of the pedestrian boulevard in this city also enabled the city authorities to make adjustments to the revitalization plan for this part of the city.</li> <li>- The effects of scientific work on the functioning of "Mordor" in Warsaw are currently being analyzed by the district authorities.</li> </ul>	<p><b>Open science and society model</b></p> <ul style="list-style-type: none"> <li>- a model of a social and geodatabase platform – a place for virtual debates and supports the development of the open information society</li> </ul>

<p><b>RESEARCH, STRATEGY</b></p> <p>Project level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Organizational value and institutional culture (Williams et. al., 2024, 7-8)</p>	<p><b>UPV</b>  <b>Research initiative with City Council of Valencia</b>  <b>DONES DE CIENCIA</b>  <a href="https://donesdeciencia.webs.upv.es/es/">https://donesdeciencia.webs.upv.es/es/</a></p>	<p>Science, gender and art come together in this project of the Universitat Politècnica de València (UPV) and the innovation centre Las Naves of the City Council of Valencia, with the collaboration of the Spanish Foundation for Science and Technology (FECYT) of the Ministry of Science and Innovation.</p> <ul style="list-style-type: none"> <li>- to make visible and pay tribute to women of reference in their respective areas and to denounce the consequences of gender inequality, both in the construction of scientific and research vocations and in the development of women's professional careers in these areas.</li> <li>- Most of the murals are located in educational centres. With them, Dones de ciència offers a unique route in our country, which gives visibility to pioneering women who broke barriers and have been and are references</li> </ul>	<p><b>Science communication/dissemination model in cooperation with city</b></p> <ul style="list-style-type: none"> <li>- visibility to pioneering women who broke barriers and have been and are references, always through the eyes of outstanding artists in the field of urban mural painting.</li> </ul>
<p>04 Living labs</p>		<p>innovative experimentation format to initiate transformation processes and facilitates collaboration between researchers and societal actors in a real-life context</p>	
<p><b>RESEARCH</b></p> <p>Project level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein</p>	<p><b>RWTH Living lab. Reallabor Theaterplatz</b>  <a href="https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tolhr/Reallabor-Theaterplatz/">https://www.humtec.rwth-aachen.de/cms/HUMTEC/Forschung/Living-Labs-Incubator/LLI-Netzwerk/Steckbrief-Datenbank/~tolhr/Reallabor-Theaterplatz/</a></p>	<p>an experimental space for the future transformation of Theaterplatz starting in 2020</p> <ul style="list-style-type: none"> <li>- transformation process initiated through various temporary interventions and actions aiming to start an open process and a dialogue</li> </ul>	<p><b>Generation of a transformation process through experimentation and dialogue</b></p> <ul style="list-style-type: none"> <li>- Gain insights for the future design of a central urban space and create images of the future</li> <li>- Create a shared space for experience and learning</li> </ul>

<p>2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>		<p>with local citizens about possible futures for the theatre square.</p> <ul style="list-style-type: none"> <li>- aim is to test new perspectives and create a shared space for experience and learning</li> <li>- experiences, ideas and suggestions from this test phase were analysed and incorporated into the further planning process</li> </ul>	<ul style="list-style-type: none"> <li>- Create connectivity and effectiveness: experiences, ideas and suggestions as stimulation of future planning process</li> </ul>
<p><b>RESEARCH, EDUCATION</b></p> <p>Interdepartmental level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>UPV On campus laboratory. UPV living lab</b></p> <p><a href="https://www.upv.es/entidades/vcampus/en/en-living-lab/">https://www.upv.es/entidades/vcampus/en/en-living-lab/</a></p>	<p>an on-campus laboratory aiming to accelerate the path towards carbon neutrality of the Universitat Politecnica de Valencia and the city.</p> <ul style="list-style-type: none"> <li>- 'sandbox' environment for testing, prototyping, scaling, teaching and learning. Used existing tools such as teaching content, internships, degrees and master projects, mobility programs, spaces for debate and reflection,</li> <li>- real test bed and experimentation environment where the university community, users and producers can co-create, explore, experiment and evaluate innovations</li> <li>- innovation environment where UPV provides facilities and resources and acts as intermediary for anyone (business, academia, citizen, students, public administration) trying to create sustainable impact</li> </ul>	<p><b>Set up of test beds/sandboxes for campus development</b></p> <ul style="list-style-type: none"> <li>- creating an experimentation environment for open innovation through iterative processes, implementation of innovative projects and test benches (sandbox) in the Vera campus that will be replicable in the neighborhoods of Valencia</li> </ul>

		through innovation, co-creation, rapid prototyping, testing and scaling of solutions	
<p><b>RESEARCH, EDUCATION</b></p> <p>Interdepartmental level and project level (Leurs et al., 2023)</p> <p>Meso level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration (Williams et. al., 2024, 7-8)</p>	<p><b>TUB</b></p> <p><b>Living lab experiment. Hands-on research</b></p> <p><b>COLLOC WORKSHOP SERIES</b></p> <p><a href="https://colloc2019.wixsite.com/colloc2019/about-the-workshop">https://colloc2019.wixsite.com/colloc2019/about-the-workshop</a></p>	<p>joint transdisciplinary research project in a living lab experimentation format – an international workshopseries with hands-on research since 2018 in a self organised occupation Brasil</p> <p>COLLOC – Collaborative production of transformation knowledge in self-organized occupations</p> <ul style="list-style-type: none"> <li>- cooperation between science and society, between different institutions in Germany and Brasil and alumni worldwide and between different academic fields, collaborations with national social movement for housing rights MNLM, with socio-technological initiatives and the dwellers</li> <li>- Main principles: <ul style="list-style-type: none"> <li>01_team of co-researchers in existing network of scientists students, alumni, residents, activists, socio-technical initiatives, and nature processes.</li> <li>02_collaborative and interactive knowledge production with different types of knowledges (academic, technical, everyday, traditional, nature competences)</li> </ul> </li> </ul>	<p><b>Development of a transdisciplinary Dual Design strategy and creation of common ground in workshop with vulnerable communities</b></p> <ul style="list-style-type: none"> <li>- collaboratively defining the problem for transformation with topics for sustainable development and resilience (e.g. food system, housing and collective open space, water system)</li> <li>- knowledge integration and development work: co-production of systemic scenarios and the materialization of transformation knowledge through collaborative planning, negotiating, designing and building of problem solutions</li> <li>- Development of short term and long term solutions through different formats of knowledge integration</li> <li>- Collaboratively reflecting the societal and scientific impact and transferability</li> </ul>

		03_Dual Design Strategy: collaborative development of systemic scenarios + spatial interventions	
05 Master courses/programmes/projects		Area of education and curricula	
<p><b>EDUCATION</b></p> <p>Interdepartmental level and project level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + Teaching and curriculum (Williams et. al., 2024, 7-8)</p>	<p><b>RWTH Educational project. LEONARDO</b></p> <p><a href="https://www.leonardo.rwth-aachen.de/en/homepage/">https://www.leonardo.rwth-aachen.de/en/homepage/</a></p>	<p>Interdisciplinary educational project/ concept launched by RWTH in 2008</p> <ul style="list-style-type: none"> <li>- Lecturers from different academic cultures offer a course focussing on a social challenge and aimed at students from all faculties</li> <li>- Aiming to discuss a key topic in an interdisciplinary way</li> <li>- In addition, student initiatives have also the opportunity to help organise a "Leonardo" event</li> <li>- courses have been offered on topics such as energy, climate change, world population and health, flight and migration, culture, medical technology, sustainable development goals, human animal studies and fake news.</li> <li>- "Thinking the Future" – this motto is also taken up by Projekt "Leonardo". Our goal is to identify global challenges and to search for solutions.</li> <li>- made a central pillar in the Human Technology Center, which is a platform for shaping an integrated</li> </ul>	<p><b>Set up of interdisciplinary teaching modules</b></p> <ul style="list-style-type: none"> <li>- In addition to lecture series, the project now also offers more workshops that enable more interaction and interdisciplinary collaboration in smaller groups. The "Leonardo" project focuses on four principles for the design of teaching and learning formats: Interdisciplinarity, interaction, responsibility, and participation.</li> <li>- Current courses summer term 2024: Social justice, Rethinking resources, Sustainability and Transformation, Temporary University Hambach among others</li> </ul>

		interdisciplinary scientific culture at RWTH Aachen University.	
<p><b>EDUCATION</b></p> <p>Interdepartmental level and project level (Leurs et al., 2023)</p> <p>Micro level (Baptista &amp; Klein 2022; Williams et al., 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Inter-organizational collaboration + Teaching and curriculum (Williams et. al., 2024, 7-8)</p>	<p><b>CHALMERS TRACKS educational initiative</b>  <a href="https://www.chalmers.se/en/education/study-at-chalmers/why-chalmers/tracks-a-unique-educational-initiative/">https://www.chalmers.se/en/education/study-at-chalmers/why-chalmers/tracks-a-unique-educational-initiative/</a></p>	<p>Tracks is a unique educational initiative between different programmes in the form of elective courses, where the choices are guided by personal interest. The framework of Tracks provides opportunities for individualised study and collaboration between students, industry, the community and academia.</p> <ul style="list-style-type: none"> <li>- The initiative reduces the time required to offer new educational content, in collaboration with academia, industry and society.</li> <li>- Tracks courses are held in close collaboration with representatives from industry, society and cutting edge of research.</li> <li>- Participants collaborate across program boundaries to learn by exploring societal and scientific challenges together. The initiative helps the university to be agile and adaptable to continue to be relevant.</li> </ul>	<p><b>Set up of interdisciplinary competences under the framework of elective courses and through cooperation with industry and communities</b></p> <ul style="list-style-type: none"> <li>- Tracks courses are elective and don't belong to any specific programme or department.</li> <li>- They give students the opportunity to develop their interdisciplinary competence.</li> </ul>
<p><b>EDUCATION</b></p> <p>Course level (Leurs et al., 2023)</p>	<p><b>CHALMERS Collaboration between architects and engineers working on a project in partnership (e.g. Gothenburg City).</b>  <b>MASTER'S COURSES</b>  <b>Dare 2 Build</b></p>	<p>a set of interlinked courses which focus on societal aspects of architecture and urban design, collaboration with local stakeholders, and taking a practice-oriented approach to learning, includes studios such as Dare2Build, Design and Planning for Social Inclusion, and</p>	<p><b>Set up of a parkour as a playful training method</b> combining physical activity, sport challenges, training and fun-gathering moments</p> <ul style="list-style-type: none"> <li>- fosters and promotes more community creativity</li> </ul>

<p>Micro level (Baptista &amp; Klein 2022; Williams et al, 2024, 5, Wieck et al. 2025 foreseen)</p> <p>Teaching and curriculum (Williams et. al., 2024, 7-8)</p>	<p><a href="https://play.chalmers.se/media/Parkourius+2021+-+Forest+Parkour/0_ccc4325w">https://play.chalmers.se/media/Parkourius+2021+-+Forest+Parkour/0_ccc4325w</a> <b>Design and Planning for Social Inclusion Studio</b></p>	<p>Reality, as well as the Master’s thesis direction on Design Activism</p> <ul style="list-style-type: none"> <li>- DARE to Build” is a design-and-build focused summer course at Chalmers University of Technology, offered to civil engineering and architecture masters students. It aims to offer the students a common and experimental learning platform and at the same time address and contribute to positive local development.</li> <li>- concept was within a master course in architecture "Design and Planning for Social Inclusion” and in a co-creation process together with the local community and youth from Bergsjön</li> </ul>	<ul style="list-style-type: none"> <li>- help make parkour part of the local identity</li> <li>- stimulate social engagement and interaction</li> </ul>
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