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Best practices and recommendations for Super-Labs operation towards the region transition

Deliverable No.:	D5.3
Project Acronym:	TRANSFORMER
Full Title: Designing long-term systemic transformation frameworks for regions. Accelerating the shift towards climate neutrality	
Grant Agreement No.:	101069934
Work package/Measure No.:	WP5
Work package/Measure Title: Evaluation & Impact Assessment	
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Responsible Co-Author(s):	
Date:	31.07.2024
Status:	Final
Dissemination level:	Public

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Abstract

This deliverable provides a comprehensive set of best practices and recommendations for the operation of Transition Super-Labs (TSLs) to facilitate regional transitions towards climate neutrality. It draws from the TRANSFORMER project's findings and experiences in four European regions (Emilia-Romagna (Italy), Lower Silesia (Poland), the Ruhr Area (Germany), and Western Macedonia (Greece)), aiming to bridge the gap between research and practical implementation of Transition Super-Lab (TSL) methodologies.

Project Partners

Organisation	Country	Abbreviation
RUHR-UNIVERSITAET BOCHUM	DE	RUB
RUPPRECHT CONSULT-FORSCHUNG & BERATUNG GMBH	DE	RC
BUSINESS METROPOLE RUHR GMBH	DE	BMR
REGIONE EMILIA ROMAGNA	IT	RER
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TWENTY COMMUNICATIONS SRO	SK	TWE
EUROPEAN NETWORK OF LIVING LABS IVZW	BE	ENoLL

Document History

Date	Person	Action	Status	Diss. Level
16.07.2024	Maria Konstantinidou (CERTH)	Submission of the document to reviewers	Draft	WPL
19.07.2024	Otar Nemsadze	Review	Draft	WPL
22.07.2024	Thomas Meister (RUB)	Review	Draft	WPL
29.07.2024	Maria Konstantinidou (CERTH)	Final Review	Final	WPL
31.07.2024	Thomas Meister (RUB)	Approval	Approved	PC
		Submitted		PO

Status: Draft, Final, Approved, and Submitted (to European Commission).
Dissemination Level: WPL = Work Package Leader, PM = Project Manager, PC = Project Coordinator, PO = Project Officer

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List of Acronyms

CEI	Carbon Emissions Intensity
CI	Composite Indices
GHG	Greenhouse gas emissions
IoT	Internet of Things
NGOs	Non-Governmental Organizations
QRAFT	Quantitative Regional Assessment Framework for Transition Super-Labs
TSL	Transition Super-Lab

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Executive Summary

This deliverable aims to provide a comprehensive set of best practices and recommendations for the operation of Transition Super-Labs (TSLs) to facilitate regional transitions towards climate neutrality. It draws from the TRANSFORMER project's findings and experiences in four European regions (Emilia-Romagna (Italy), Lower Silesia (Poland), the Ruhr Area (Germany), and Western Macedonia (Greece)), aiming to bridge the gap between research and practical implementation of Transition Super-Lab (TSL) methodologies. The primary audience includes project partners, stakeholders in TSL regions, and follower regions interested in adopting the TSL approach.

Although this deliverable is developed within the WP5 ''Evaluation & Impact Assessment'', the required input for developing the recommendations were collected throughout the whole duration of the TRANSFORMER project during the implementation of all WPs. Additionally, Deliverable D5.3 is directly linked to the Deliverable D3.4 ''Transition Super-Labs' Lessons Learned''[1] that gathers all the knowledge and the experience of the four TRANSFORMER TSLs and relevant partners on the different steps and activities of the Transition Super-Lab Roadmap.

After an introduction in Chapter 1 presenting the TSL as an emerging approach for addressing the urgent need for systemic transformation to achieve climate neutrality, Chapter 2 outlines the TSL approach, emphasizing the use of enriched living lab methodologies to co-create regional transformation strategies. It also presents the methodological approach of developing recommendations by collecting data across various WPs of the TRANSFORMER project discussing the advantages and limitations of this methodology. Chapter 3 is the core of the document, offering detailed recommendations in six key areas:

- ✓ **Establishment of a TSL**: Guidelines for setting up TSLs, including stakeholder engagement and infrastructure requirements.
- ✓ **Tactics of a TSL**: Strategies for effective operation, including methodologies for co-creation and experimentation.
- ✓ **Operation of a TSL**: Operational best practices, including governance structures and resource management.
- ✓ **Governance of a TSL**: Recommendations on creating inclusive governance frameworks that involve all stakeholders.
- ✓ **Stakeholder Engagement**: Strategies for engaging diverse stakeholders, ensuring their active participation and contribution.
- ✓ **Increasing Transition Readiness**: Suggestions for enhancing the preparedness of ecosystems to undertake large-scale transformations.

The final chapter reflects on the lessons learned from implementing TSLs and outlines future research needs. It emphasizes the importance of continuous adaptation, stakeholder engagement, and knowledge dissemination to sustain the momentum towards climate neutrality. The chapter calls for ongoing innovation and collaboration to address emerging transition challenges and opportunities.

This structured approach of Deliverable D5.3 provides a comprehensive guide for regions looking to implement or enhance TSL approach, fostering a collaborative and innovative environment for sustainable regional transformation.

[1] TRANSFORMER Project, (2024), Deliverable 3.4 ''Transition Super-Labs' Lessons Learned'', (URL not available yet)

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1 Introduction

To tackle climate change, the Paris Agreement[2] and the European Green Deal[3] set out very ambitious goals that require an urgent and radical transformation of the EU economy. Reaching the goal of net-zero emissions by 2050 needs immediate action going beyond the level of fostering innovation and digitalisation in societal niches. It calls for an innovation path which sets out to design carbon neutral societal systems and focus investments in zero-carbon solutions.

The TRANSFORMER project takes up this challenge by designing long-term systemic transformation frameworks for European regions to accelerate the shift towards climate neutrality: the **Transition Super-Lab approach** (TSL)[4]. A TSL adapts and applies enriched **living lab methodologies** in order to develop (co-create) together with all relevant stakeholders from the quadruple helix a vision for a regional transformation and a **portfolio of large-scale systemic solutions** for climate neutrality, net-zero emissions and resilient future. The **systemic transformation** within TSL catalyzes large and diverse communities to innovate for systemic changes that accelerate transition at scale. The **systemic transformation** will be achieved by developing and implementing a portfolio of connected solutions ("e.g., Pilot use cases") which engage **multiple leverage points** at the **intersection of socio-technical regimes** simultaneously in order to achieve a rapid and more efficient transformation[5]. This approach is tested in four regions within TRANSFORMER project: Emilia-Romagna in Italy, Lower Silesia in Poland, the Ruhr Area in Germany and Western Macedonia in Greece as seen in Figure 1. Each region is faced with a unique set of challenges and socio-technical systems that will impact the TSL development and goals.

The goal of this deliverable is to develop a set of the recommendations that will provide practical and actionable suggestions based on TRANSFORMER project findings and the TSLs experiences, guiding future actions, policies, or interventions on Super-Labs operation towards the region transition. Recommendations bridge the gap between the research outcomes as developed within the project and their real-world application by TRANSFORMER TSLs. Thus, the primary target groups are the project partners in the four TSL regions and the involved stakeholders in the TSL regions as well as the follower regions that are interested in implementing the TSL approach.

[2] United Nations (2015). Paris Agreement, https://treaties.un.org/Pages/showDetails.aspx?objid=0800000280458f37&clang=_en

[3] European Commission (2019). The European Green Deal. Brussels, Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

[4] The definition and description of the TSL transition model in this chapter was discussed and written jointly by the members of the TRANSFORMER Project Consortium.

[5] For example, developing green hydrogen-solutions for simultaneously transforming the mobility and the industrial sector. For a more detailed explanation of leverage points ("levers of change") and the portfolio approach see: Deliverable D2.1, Available at: https://transformerknowledgehub.imet.gr/wp-content/uploads/2024/06/D2.1_Summary-of-data-collection-on-TSL-predecessors.pdf

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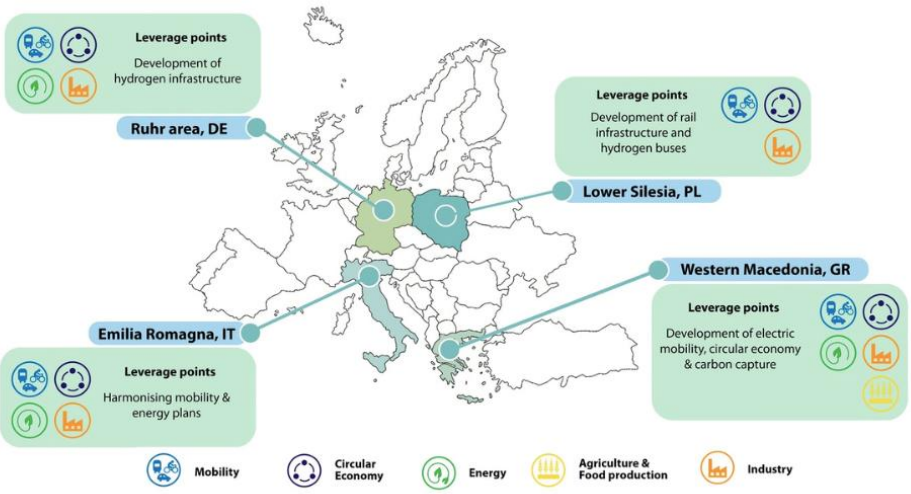

Figure 1: TSL regions[6]

To meet the deliverable objective, this deliverable is structured as follows: The subsequent Chapter 2 presents the methodological approach that was followed for developing the recommendations as well as the advantages and the limitations. In Chapter 3, the recommendations are elaborated clustered in six different groups. Finally, Chapter 4 concludes with a reflection on the recommendations and provides an outlook on further research needs.

2 Methodology and approach

2.1 The TSL approach

A Transition Super-Lab is an ecosystem of actors organized to accelerate the transformation towards climate neutrality through innovation, and cross-sectorial synergies on a regional scale. It benefits from a collaborative governance, operates in accordance to systemic transformation principles and utilizes transition enabling methods and tools in order to create added value to cross-sectorial initiatives for economic transformation and to provide feasible solutions to complex regional transformation challenges.

The TSL approach adapts and applies enriched living lab methodologies in order to develop (co-create) together with all stakeholders from the quadruple helix and society a vision for a regional transformation and a portfolio of large-scale systemic solutions for climate neutrality, net-zero emissions and resilient future. The systemic transformation within TSL catalyzes large and diverse communities to innovate for systemic changes that accelerate transition at scale.

The systemic transformation will be achieved by developing and implementing a portfolio of connected solutions ("e.g., Pilot use cases") which engage multiple leverage points at the intersection of socio-technical regimes simultaneously in order to achieve a rapid and more efficient

[6] TRANSFORMER Project Proposal

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transformation[7]. Therefore, the adaptation of Living Lab methodologies to a large-scale and with a focus on systemic transformation can be regarded as the core characteristics of a TSL (Figure 2):

1. Adaptation and application of enriched Living Lab methodologies (co-creation, experimentation and evaluation)
2. Aiming at large-scale systemic solutions for a rapid sustainable transformation
3. Applying a portfolio approach of measures (experiments) and using multiple leverage points for systemic change simultaneously

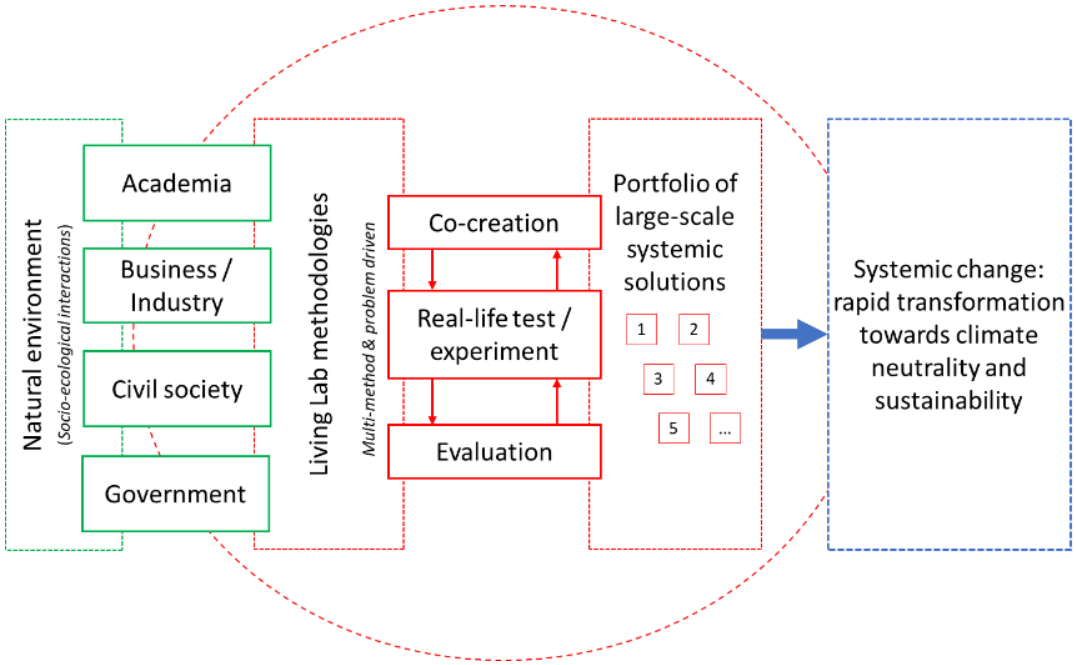

Figure 2: Elements of a Transition Super-Lab[8]

2.2 Methodological approach

Although this deliverable is developed within the WP5 ''Evaluation & Impact Assessment'', the required input for developing the recommendations were collected throughout the whole duration of the TRANSFORMER project during the implementation of the WP2, WP3, WP4 and WP6. Also, Deliverable D5.3 is directly linked to the Deliverable D3.4 ''Transition Super-Labs' Lessons Learned''[9] that gathers all the knowledge and the experience of the four TRANSFORMER TSLs and relevant partners on the different steps and activities of the Transition Super-Lab Roadmap.

7 The definition and description of the TSL approach in this chapter was discussed and written jointly by the members of the TRANSFORMER Project Consortium. It is also included in Deliverable 2.2.

8 TRANSFORMER Project, (2024). Deliverable 2.1 '' Summary of data collection on TSL predecessors'', Available at: https://transformerknowledgehub.imet.gr/wp-content/uploads/2024/06/D2.1_Summary-of-data-collection-on-TSL-predecessors.pdf

9 TRANSFORMER Project, Deliverable 3.4 ''Transition Super-Labs' Lessons Learned'', (URL not available yet)

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The methodology followed for the development of the recommendations consists of the following stages (Figure 3):

- ✓ **Define the research question**: The first step is to define the research question and set the objectives before writing recommendations. This ensures that the recommendations are relevant and address directly the scope of the document. For this specific document the research question is ''***How can a Transition Super-Lab operate successfully in accelerating the transition process of a region towards climate neutrality?***'' The objectives are to provide all regions that want to follow the TSL approach with a comprehensive guide on how to establish and operate successfully a Transition Super-Lab.

- ✓ **Review the research outcomes within TRANSFORMER project**: As soon as the research question is defined it is important to review all the research outcomes that developed within the project during the conceptualization phase of TSL. This includes the transition model, the Transition Super-Lab Roadmap and the different assessment framework. This step helps in the identification of the gaps between the research outcomes and their practical implementation.

- ✓ **Collect and analyse data from different sources**: This step included the collection of input from the TSLs activities performed during the project implementation. So, input was collected from different WPs (WP2, WP3 WP4, WP5 and WP6).

- ✓ **Develop recommendations**: This is the last step, where the recommendations are being developed explaining how each of them contributes to addressing the research question. For each of the recommendations a detailed description is provided, helping the reader to understand the importance of following your suggestions. A concise summary at the end of the report emphasizes how following these recommendations will contribute to the successful operation of a TSL.

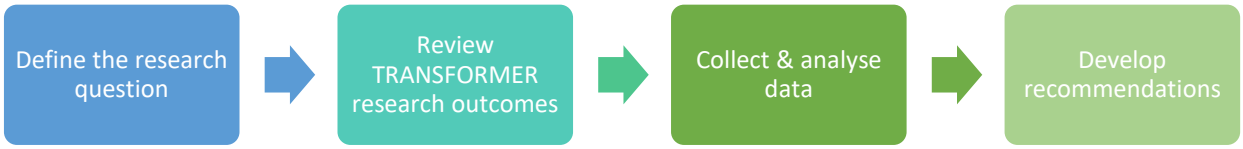

Figure 3: Methodological approach off developing the recommendations

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The recommendations were developed according to the following 5 characteristics: actionable, evidence based, effectively communicated, mention feasibility and contextual (Figure 4).

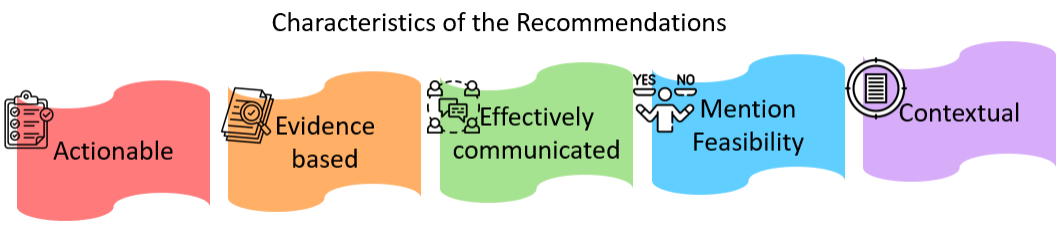

Figure 4: Characteristics of the recommendations

Recommendations should be **actionable**, practical and provide clear steps or actions that can be taken. Recommendations should be **evidence based**, grounded in solid evidence and research findings. Recommendations should be clear in order to be **effectively communicated** to the target groups. Recommendations should consider and **mention the feasibility**, including practical aspects. Finally, recommendations should be relevant and appropriate to the specific **context** or situation they are addressing.

These five characteristics were taken into account to develop recommendations that will contribute meaningfully to the successful operation of a TSL. The recommendations presented in this document have the following advantages:

- ✓ **Provide practical guidance:** The recommendations offer actionable steps and practical suggestions on how a TSL can be established and operate in order to accelerate the region's transition process towards climate neutrality. They help the regions to apply the TRANSFORMER findings in real-world settings.
- ✓ **Improve decision-making:** Recommendations can enhance the quality of decisions. This leads to more informed and effective choices in policy, business, and other areas.
- ✓ **Enhance accountability**: Implementing recommendations can increase transparency and accountability. This ensures that actions are backed by evidence, making it easier to track and evaluate outcomes.
- ✓ **Encourage further research:** Recommendations often highlight gaps in current knowledge, prompting additional studies. This drives the continuous advancement of knowledge and innovation in various fields.
- ✓ **Promote innovation:** By suggesting new approaches or solutions, research recommendations can foster innovation. This encourages creative thinking and the development of novel ideas and technologies.

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Although the benefits are important, the recommendations have also some limitations as presented below:

1. **Require context specificity:** Recommendations must be tailored to specific contexts to be effective. Broad recommendations may not be applicable in all situations requiring customization.
2. **Implementation challenges:** Practical difficulties can arise when trying to implement research recommendations. Implementation challenges include factors like resource limitations, resistance to change, and logistical issues.
3. **Provide limited scope:** Recommendations might focus on specific aspects, leaving out broader considerations. This can limit their overall impact and applicability in wider contexts.
4. **Uncertain about time:** The time required to see the effects of implementing recommendations can be uncertain. This uncertainty can affect planning and the perceived value of the recommendations.
5. **Introduce Bias:** Recommendations can sometimes reflect the biases of the researchers or the study design. This can lead to skewed or partial insights, affecting the reliability of the recommendations.

The Figure 5 highlights that while research recommendations have significant advantages such as providing practical guidance, improving decision-making, enhancing accountability, encouraging further research, and promoting innovation, they also come with limitations like the need for context specificity, implementation challenges, limited scope, uncertainty about time, and potential biases. Recognizing these pros and cons can help in better planning, execution, and evaluation of research-based initiatives.

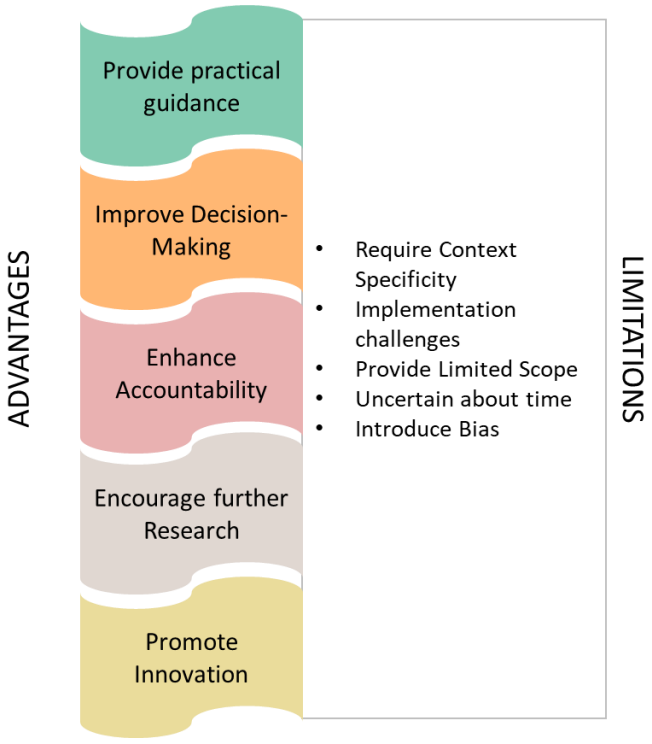

Figure 5: Advantages and limitations of the recommendations

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The recommendations are related to the different phases and steps of the transition model as initially described in Deliverable D5.1[10] and further elaborated in the Transition Super-Lab Roadmap (Deliverable D4.2)[11]. Summarizing here the first phase is a preparatory stage that helps each TSL to create a fertile ground for the transition by consuming the capacities of the local ecosystem and by using common knowledge and understanding of the problems to be solved. This stage contains a sequence of paces that a TSL should follow (definition of TSL scope, coalition building activities, definition of the pathways) and the milestones that should be achieved at the end of this stage are considered critical for the continuation and the success of the transition process.

In the second phase, the TSLs continue the coalition building activities trying to increase cross-sectorial ecosystem capacity towards innovative sustainable sectors. Activities related to the selection of the Pilot use cases, the examination of their feasibility and the value creation for the different stakeholders involved in the TSLs are included.

In the third phase, TSLs stakeholders should collaborate in innovative solutions development and demonstration of mature innovative solutions in alleviating barriers. This could be achieved through the definition of "quick wins'', the adoption of international innovative solutions and the development of Action Plans for the Pilot use cases and the long-term implementation of the TSLs.

Finally, for a transition process to be effective and successful, it is important to secure innovative policy responses to maximize implementation and impact of the solutions and achieve full adoption by the citizens. Specific steps and activities towards this direction such as the definition of emblematic innovative transition projects and the monitoring of the efficiency and success of the transition process are included in the fourth phase of the transition model and Transition Super-Lab Roadmap.

The recommendations are clustered in different groups related to the establishment, the tactics and the operation of a TSL as well as recommendations related to the TSL governance and stakeholders' engagement that are running during the whole process from the planning phase for establishing the TSL to its operation (see Figure 6). To make it clearer for the reader, each recommendation is linked to a specific phase of the transition model and Transition Super-Lab Roadmap.

Figure 6: Recommendations clusters

[10] TRANSFORMER Project , Deliverable 5.1 ''Framework for Super-Labs Assessment'', Available at: https://transformerknowledgehub.imet.gr/wp-content/uploads/2024/06/D5.1_Framework-for-Super-Labs-Assessment_public.pdf

[11] TRANSFORMER Project, (2024), Deliverable 4.2 '' Transition Super-Lab Roadmap'' (URL not available yet)

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3 Recommendations

3.1 Recommendations related to the establishment of a TSL

The recommendations related to the establishment of a TSL are mainly related to the transition model that has been developed in the project.

3.1.1 Understanding and reflecting on the region

Understanding and reflecting on the region is crucial for establishing Transition Super-Lab. Different regions have different challenges and needs as well as distinct environmental features. A deep understanding of the local context helps in developing a vision, designing suitable pathways and tailored actions and projects that address the specific problems of the region, thus ensuring the resilience and sustainability of the TSL. Reflecting on the region's unique characteristics allows for the development of innovative solutions tailored to local conditions. It also allows for better use of local resources. This ensures that the initiatives are sustainable and can be maintained over the long term. This increases the likelihood of success and impact but also helps in adapting the solutions in cases of changing local conditions and emerging challenges, making the TSL more resilient and responsive.

Moreover, each region operates under different regulatory frameworks. Understanding these regulations ensures that the TSL operates within legal boundaries and can effectively advocate for necessary policy changes. Additionally, aligning the lab's initiatives with regional development plans and policies can attract support and funding from local governments and other public institutions.

Except of the alignment of the TSL's initiatives with the needs and potentials of the region, reflecting on regional characteristics helps in building trust with the local community and the stakeholders. When the stakeholders see that their unique context is understood and respected, they are more likely to participate and support the TSL's initiatives, as a sense of ownership and commitment is developed among them.

Initiatives that reflect regional characteristics are more likely to positively impact the region and create a fruitful ground for systemic transformation fostering a shift to a more sustainable economic model. Insights gained from the regional context can be used to replicate successful initiatives in regions with similar contexts, thereby scaling the impact of the Transition Super-Lab. For understanding and reflecting on a region, two assessment frameworks that were developed within the TRANSFORMER project are recommended to be used by the region.

3.1.1.1 Quantitative Regional Assessment Framework for Transition Super-Labs

The "Quantitative Regional Assessment Framework for Transition Super-Labs (QRAFT)" compares regional transition needs (Greenhouse gas emissions per capita development and the carbon emissions intensity (CEI) of economic sectors between EU regions) and regional transition potentials from a TSL perspective (by recurring to existing Composite Indices (CI)). This framework supports a region in conducting the first steps in the TSL process of identifying the regional challenge and possible topics for transition and developing a vision for transformation (Activity 1.2 in the TRANSFORMER Transition Super-Lab Roadmap).

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QRAFT is designed to function as a tool for gaining a data-driven understanding of the importance of different possible TSL vision topics within a region for stakeholders with limited knowledge about their region. It also enables knowledgeable stakeholders to question existing narratives about their region if necessary. The insights generated through the QRAFT methodology can also feed into later steps of the TSL process (i.e., developing pathways and scenarios for transformation, developing feasible solutions and contributing to assessment processes)[12].

3.1.1.2 Transition readiness assessment

The transition readiness assessment of a region is built upon a systemic approach to cross-sectorial transition ecosystem ("what is a transition ready ecosystem?") that defines the required elements and sub-elements that a region should have in order to be characterized as transition-ready.

The TSLs are able to use the Transition Readiness Self-Assessment Tool answering a set of qualitative questions to calculate their transition readiness level and identify their weak points. A couple of quantitative questions that complement the qualitative ones are also included in the tool. The analysis also allows for a comparative assessment with benchmark and other region's transition readiness, highlighting areas of concern that fall below the average performance and providing recommendations (linked to transition model/ Transition Super-Lab Roadmap) on how to speed up the transition towards climate neutrality[13].

Although Transition readiness assessment is a useful step for the creation of possible pathways/scenarios in the beginning of the transition process, it is an iterative process allowing for adjustment of the transition pathways and the use cases. This continuous learning during the next phases of the transition process (Activity 11.4 of TRANSFORMER Transition Super-Lab Roadmap) is also crucial for adapting the strategies that were designed to accelerate a successful transition towards climate neutrality, ensuring that the region remains on course to achieve its desired outcomes and maximize the impact of its transition efforts through the Pilot use cases.

3.1.2 Initiating the TSLs

The process of initiating a TSL incorporates the following four essential elements (Figure 7):

- ✓ Coalition-building, including mapping of stakeholders
- ✓ Development of the transition vision
- ✓ Pilot use cases development process
- ✓ Development of an Action Plan

[12] For detailed information about QRAFT, its criteria, and limitations, see Deliverable D2.2. ''Quantitative mapping research report'', Available at: https://transformerknowledgehub.imet.gr/wp-content/uploads/2024/06/D2.2_Quantitative-mapping-research-report.pdf

[13] For detailed information about the Transition Readiness Assessment and the TSLs' results, see Deliverable D5.2. (URL not available yet)

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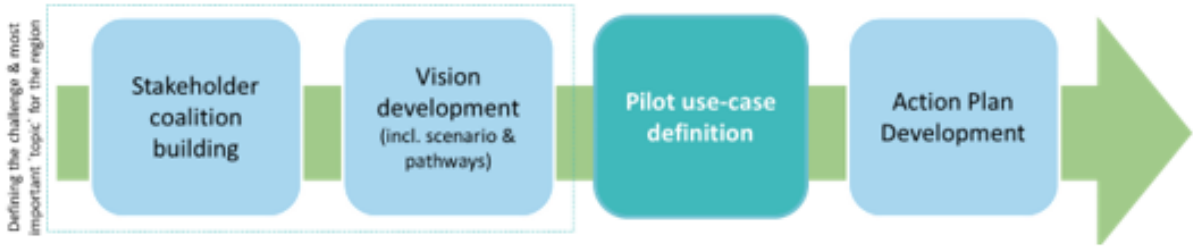

Figure 7: TSL initiating process

3.1.2.1 Develop a coalition building

A coalition brings together stakeholders from various sectors, including academia, industry, government, and civil society ensuring that a wide range of interests and viewpoints is represented, lending greater legitimacy and credibility to the TSL's activities. Building a coalition ensures that all stakeholders are aligned on the vision, goals, and objectives of the TSL. This shared understanding is crucial for coordinated efforts and collective impact. In the TRANSFORMER project, coalition building starts with the identification of the transition-related stakeholders from the quadruple helix in the first step of the transition process and continues throughout the whole process with their engagement in the TSLs activities. Based on the vision and the Pilot use cases, each TSL should create a unique roster of key stakeholders from the public sector, private sector, academia and civil society. Following this approach, the TSL promotes inclusivity and fosters a sense of ownership and empowerment, leading to higher levels of participation and support.

3.1.2.2 Develop a clear and inclusive vision and co-define goals and objectives

Vision development is an essential element of the TSL process. It is crucial for achieving long-term transformation because it provides a clear set of goals, direction, alignment and collaboration among the key stakeholders. An inclusive vision means that the different needs of the involved stakeholders are taken into consideration inspiring and motivating them to participate in the activities of the TSL by investing time, resources, and expertise into realizing the vision. To achieve this, it is essential to use a combination of a top-down and bottom-up approach in the co-creation of the vision from the very beginning. A well-defined vision articulates clearly the purpose to all involved stakeholders and communicate the TSLs impact and value proposition. Additionally, the stakeholders should avoid being too biased regarding the vision and without disregarding the wider context, to build it as a genuine regional vision that truly represents the desired future for the region.

Developing a vision is a complex exercise, especially if the topic at hand is broad. For this reason, the TSLs should focus on developing sub-visions which make it possible to illustrate the overall vision. This will make the vision process more effective and concrete. Additionally, the vision building process must be dynamic and needs to foster experimentation but staying in line with reality and regional context.

For the co-definition of the goals and objectives, it is important to find the right balance between ambitious goals on the one hand and realistic goals on the other hand. When formulating goals, the TSLs should think about responsibilities for stakeholders to be involved and concrete options for ownership of the respective use cases.

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3.1.2.3 Develop feasible Pilot use cases

Pilot use cases are identified as project ideas co-created with the stakeholders to achieve climate neutrality and promote systemic transformation. Pilot use cases should be developed following specific criteria aiming at creating tangible value and implemented with a focus on a regional transformation. The criteria for TSL Pilot use cases are the following:

- ✓ Contribution to the goal of climate neutrality (according to agreed visions and scenarios)
- ✓ Potential for systemic transformation
- ✓ Regional character beyond merely local solutions and expected value for the region
- ✓ Experimental and innovative approach (may refer to the Pilot use cases' content or the development process)
- ✓ Potential for co-creation during the development phase (beyond the initial phase of definition and selection)
- ✓ Cross-sectorial approach

The TSLs should reflect on the value proposition for each stakeholder to ensure that they will be motivated and willing to contribute to the identification and the implementation of the Pilot use cases. Additionally, the use cases must be realistic within a predefined time frame to maintain stakeholder engagement. Despite numerous ideas, the number of use cases should be limited to remain manageable. Although transition is a broad topic, the TSLs should avoid spreading their efforts—at least in the initial phases of TSL.

For examining the feasibility of the Pilot use cases, the TSLs should define SMART indicators (specific, measurable, achievable, relevant, and time-bound) to ensure they are clear, actionable, and trackable. Moreover, the TSLs should consider the availability of reliable data needed to monitor the chosen indicators.

3.1.2.4 Develop a detailed Action Plan

An Action Plan should be developed for long-term implementation and establishment of a Transition Super-Lab. This document should include the various measures necessary to realize the vision set by the TSL and is directly linked with the Pilot use cases. A complete Action Plan should follow the structure below:

- ✓ List all the tasks that need to be accomplished during the implementation of real-life test experiments and develop detailed plans for each activity outlining specific steps and resource requirements
- ✓ Put a price tag on the implementation and identify a financing plan
- ✓ Agree on stakeholders' responsibilities
- ✓ Define a timeline breaking down larger initiatives into manageable tasks to facilitate effective execution and monitoring of progress. The involvement of different stakeholders requires a comprehensive planning and defined timelines to manage complexity and to ensure continued engagement of the stakeholders.

By putting actions into detail, the TSL team can ensure clarity, accountability, and alignment with overall objectives.

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3.2 Recommendations related to the tactics of a TSL

Combination of top-down and bottom-up approach for the vision development

For the vision development of the TSL, it is important to follow a combined top-down and bottom-up approach. This integrated approach leverages the strengths of both perspectives to create a comprehensive and inclusive vision that will drive the region's systemic transformation. A top-down approach ensures that the vision is aligned with the broader regional policies and goals which facilitates the allocation of resources, funding and support from the higher levels of authority. On the other hand, a bottom-up approach ensures that the vision reflects the needs of the (local) communities and the stakeholders that are directly involved in the TSL while encouraging grassroots innovative solutions that are often more adaptable to local contexts.

Additionally, the (local) communities acquire a sense of ownership and commitment meaning higher likelihood to be engaged throughout the different TSL operations. By combining top-down and bottom-up approaches, a TSL can develop a vision that is both strategically sound and deeply rooted in the (local) communities it serves. Sometimes, it is not feasible to perform a top-down and bottom-up approach at the same time. So, it would be useful to follow a top-down approach by establishing a clear vision for the Transition Super-Lab and once this vision is defined, it can be validated and refined with the key stakeholders. This hybrid approach ensures that the vision is comprehensive, inclusive, and adaptable, ultimately leading to more sustainable and effective outcomes.

Data integration

Data plays an important role in a TSL as it can provide valuable insights both for the assessment of the Pilot use cases and the monitoring of the efficiency and the success of the transition process. The creation of a centralised repository that collects data from the different Pilot use cases is recommended. By collating and synthesizing this data, valuable insights can be extracted containing information on successful strategies, lessons learned, best practices, and challenges encountered during Pilot use cases and projects implementation.

Additionally, key indicators related to a just transition can be created and monitored. In this way, the public debate and the effectiveness of any policies or actions will not be based simply on announcements of intentions nor on fragmentary evidence that is based more on intuition and less on the reliability of scientific analysis. On the contrary, it will be based on objective (verifiable) data that will enable policymakers to assess the effectiveness of their decisions in a timely and valid manner and to make corrective actions when needed. A TSL is suggested to analyse, assess and document the dynamic impacts of decarbonisation on key sectors and indicators providing useful data to examine the feasibility of cross-sectorial actions.

Iterative development of Pilot use cases

Define Pilot use cases and projects using a bottom-up approach through interactive discussions with all involved stakeholders. The Pilot use cases require a project-specific form of governance that may significantly differ from the overall TSL governance (depending on the complexity and scope of the project) and specific stakeholders to be involved. However, each Pilot use case needs to have at least one responsible organization/person (Pilot use case Coordinator/Manager) that interacts with the TSL Coordination and Management team to ensure that the project remains responsive to TSL objectives.

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A Pilot use case Operational Team, responsible for various tasks depending on focus, complexity and scope of the Pilot use case, is also essential.

Simplify processes

The TSLs processes should be simplified to ensure that stakeholders understand their roles and responsibilities in each step and process without being overwhelmed. This approach facilitates broader participation and prevent from conflicts of interests among the different stakeholders. TSL's coordination team should ensure that all relevant documents, including meeting minutes, project plans, and reports, are accessible to all stakeholders.

3.3 Recommendations related to the operation of a TSL

Cross-departmental collaboration

Effective and efficient collaboration among all regional departments that are working on transition topics in different sectors is a key for the operation of a TSL that focuses on cross-sector transitions. This collaboration ensures the alignment of the different activities that are planning from different regional departments in order to create a common understanding of the objective of climate neutrality. It's crucial to have a TSL Coordination and Management team acknowledged by all participants to oversee and provide support to collaborative processes. Ideally, these collaborative activities should be formally integrated into the TSL operational work plan. In cases of complex administrative management in a region with different departments involved it is recommended to create a team with a clear responsibility for developing a Transition Super-Lab and coordinating high level of coordination between the actors involved.

Cross-sectorial collaboration

Ensure a representation of stakeholders from different sectors and disciplinaries both in the Coordination and Management team of the TSL and the TSL's ecosystem. By including different experienced professionals from various fields such as mobility, energy, circular economy among others enhances the cross-sectorial character of the TSL and shift the collaboration of the stakeholders from a project-based collaboration to a regular basis.

Continuous monitoring of the operational processes

The TSLs operational processes and activities should continuously be monitored to ensure the alignment with the vision and the objectives of the TSL. Adaptation and adjustment may be needed if discrepancies or deviations are identified, corrective and mitigation measures should be taken to realign proposed actions with the vision and objectives of the TSL, ensuring the sustainability of the TSL. Integrating the findings and recommendations derived from Pilot use cases and case studies directly into the Action Plan ensures that it is grounded in evidence-based practices and informed by real-world experiences, enhancing its credibility and effectiveness.

Use benchmarking for improvement

Benchmarking against other European regions can help identify best practices. Although, the challenges that a region is facing for achieving its transition to climate neutrality are similar, a best practice that has been successfully implemented in a region may not be the most appropriate for

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another. Therefore, it is advisable to study best practices as consultation material, taking into account that their adaptation to the local context should be examined. By leveraging benchmarking effectively, a TSL can maximize its impact and achieve its goals.

Addressing political risks

Addressing political risks in a TSL is critical to ensure the continuity and success of its initiatives. To mitigate this risk, the different initiatives should focus on the technical aspects of the regional strategy and not on the political agendas of the different parties. Additionally, reducing the dependency on political funding by diversifying the TSL's funding sources, the risk of cancelling an initiative due to a political shift is minimised.

Scaling up and replication

Identifying practices, methodologies, and approaches from Pilot use cases that can be transferable to other contexts or sectors within the region contribute to the scalability and replicability potential. These transferable practices serve as building blocks for scaling up successful interventions and guiding the development of new initiatives. Developing strategies for scaling up these initiatives to broader geographical areas or replicating them in similar contexts can maximize their impact and reach.

There is a lot of transferable knowledge to be shared and disseminated among regions, being developed across other projects. There are several topical (e.g. mobility, digitalisation, citizen engagement) or city-focused (e.g. smart cities and communities) projects that face the same challenges as the transition-focused projects. Therefore, this knowledge can be also beneficial for TSLs. Cross-collaboration (e.g., more joint events or publications with direct involvement of the TSLs). and cross-sharing should be included from the start as a part of TSL capacity and awareness building.

Resource mobilization and funding

A TSL is recommended to explore diverse funding sources and financing mechanisms to sustain its activities over the long term. This may include securing grants, attracting private investments, and leveraging public-private partnerships to fund projects and initiatives. The development of a detailed business plan that outlines the TSL's vision, objectives, activities and financial projections is crucial for convincing potential funders who will ensure TSL's viability and sustainability.

Experimentation

Experimentation is crucial in a TSL for several reasons, all of which contribute to the TSL's ability to innovate, test new ideas, and achieve sustainable outcomes effectively. Experimentation allows TSLs to explore innovative solutions to climate challenges, fostering creativity and novel approaches and testing them in a real-world context. This helps assess the risks of the new solutions before full-scale implementation, minimizing potential negative impacts and providing empirical evidence of their feasibility and effectiveness. Through experimentation, TSLs can gather data and insights to support evidence-based decision-making and enhance the collective learning within the TSL. Experimentation is not only a methodological approach but a mindset that drives innovation, evidence-based decision-making, and adaptive management in TSLs. By embracing experimentation, TSLs can pioneer sustainable solutions, learn from successes and failures, and ultimately contribute to transformative changes towards a more sustainable future.

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Social innovation

Social innovations should be considered as equally important as technological innovations in achieving the goal of climate neutrality. Like technological innovations, successful social innovations are based on numerous presuppositions and require appropriate infrastructures and resources. This includes a new role of public policy and government for creating suitable framework and support structures, the integration of the economy and civil society as well as supporting measures by science and universities (e.g. education for social innovation performance, know-how transfer).

Policies

Identify and review existing supportive policies and regulatory frameworks at different levels (local, regional, national, international, UNFCCC, EU) to create an enabling environment for TSL's initiatives. This approach is helpful for different steps during the establishment of a TSL from the vision development to the implementation of the Pilot use cases and projects. Understanding supportive policies ensures that TSL initiatives align with broader governmental objectives and priorities while knowledge of regulatory frameworks helps TSLs to avoid potential conflicts or delays during the implementation of the Pilot use cases enhancing their feasibility.

Including an analysis of key risk factors

Analyzing key risk factors in a TSL is crucial to ensure its success and sustainability. These risk factors can emerge from various domains, including political, financial and operational aspects. By identifying and analyzing these key risk factors, a TSL can develop comprehensive risk management strategies to ensure its long-term success and sustainability. Proactive planning, optimisation of resource use, continuous monitoring of each action, and adaptive strategies are essential to mitigate these risks effectively. By thoroughly understanding and addressing potential risks, a TSL can achieve its goals more effectively and sustainably.

3.4 Recommendations related to the governance of a TSL

As the governance arrangements are crucial in implementing a TSL, we developed a concept for a TSL governance arrangement based on the experience in the four TRANSFORMER regions (see Figure 8; see Deliverable D2.3[14] for detailed description). It aims at establishing coordination and management mechanisms and co-creation processes on two highly connected governance levels, TSL level and Pilot use cases level, to ensure that regional transition needs, and specific project needs (portfolio approach for systemic transformation) are aligned:

3.4.1 TSL level

A TSL requires a "TSL coordination and management team" that coordinates and manages the entire TSL. The main responsibility of this team is to consider the transition needs and potentials of the entire region, as well as the specific Pilot use cases. It monitors the progress of the TSL´s actions, tasks and milestones and designs and implements the stakeholders' engagement strategy and management,

[14] TRANSFORMER Project, (2024). Deliverable 2.3 '' Regional SWOT analyses as feasibility studies to be used as evidence base in decision-making for Action plan development'' (URL not available yet)

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including the strategical management of the veto players. This team is responsible for the decision making at TSL level. However, it collaborates with the Pilot use cases coordinating team for decision making at Pilot use case level as the "TSL Coordination and Management team" may not necessarily consist of the same stakeholders as the Pilot use cases.

In addition, a TSL needs a "Reflexive monitoring board" to monitor whether actions taken in the TSL as a whole align with regional transition goals. Additionally, the "Reflexive monitoring board" monitors TSL processes, advises the "TSL Coordination and Management team" on transition-related content, as well as TSL coordination and management issues (e.g., suggesting streamlining of management and coordination processes; continuously reflecting on whether all necessary stakeholders are represented in the TSL management team). Finally, it provides scientific and technical expertise on different fields, policy analysis, economic development and innovation management among others.

The supporting stakeholders of a TSL are involved in the generation of ideas and innovations, supporting TSL goals (not just Pilot use case goals) and are actively participate in the generation and provision of data. The opposing stakeholders of a TSL (veto players) are identified and strategically managed by the "TSL Coordination and Management team".

3.4.2 Pilot use case level

The Pilot use cases require a project-specific form of governance that may significantly differ from the overall TSL governance (depending on the complexity and scope of the project). However, every Pilot use case needs to have at least one responsible organization/person (Pilot use case coordinator/manager) that interacts with the TSL management team.

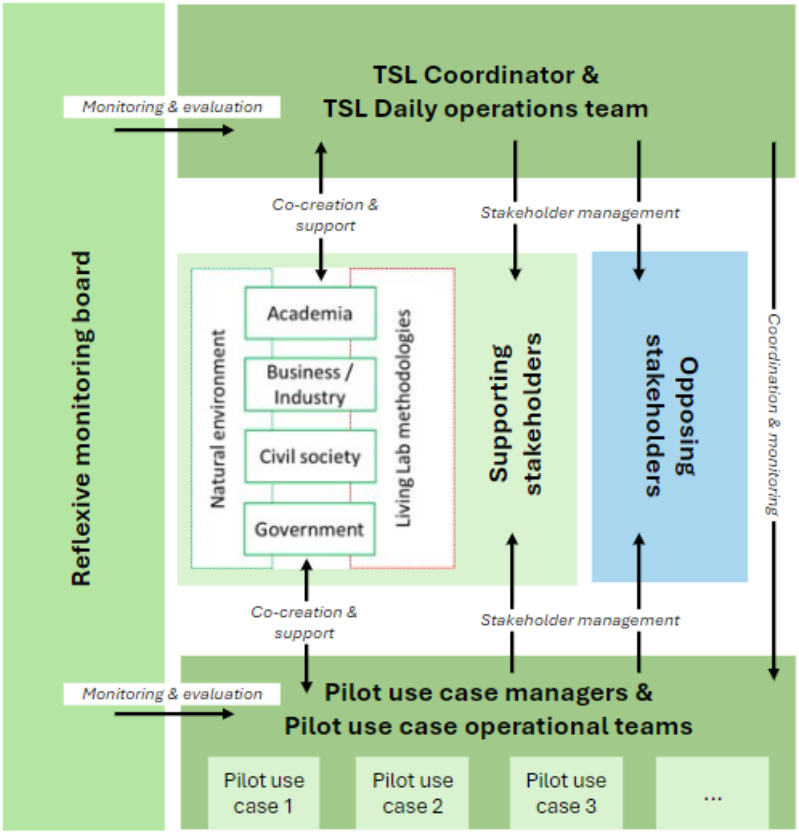

Figure 8: Stylized organigram of TSL governance blueprint

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3.5 Recommendations related to stakeholders' engagement

Stakeholders' engagement is a crucial point in Transition Super-Lab operation. By implementing the following recommendations, Transition Super-Labs can create a dynamic and inclusive environment that encourages active participation and collaboration among all stakeholders, driving innovation and positive impact within the community. More detailed recommendations on stakeholders' coalition building and citizens engagement can be found in Deliverable D3.1[15].

Develop a robust and detailed stakeholders communication and engagement plan

When developing a communication and engagement plan it is crucial to create a common understanding of different stakeholders, define the value proposition of each stakeholder, use appropriate language, and modify your message depending on your audience. It is also crucial to have a proper follow-up when engagement activities end and to manage the expectations of the stakeholders.

Representatives from the quadruple helix

Engaging a diverse group of stakeholders from the quadruple helix in the TSL requires a structured and inclusive approach that should be carefully planned beforehand to ensure representation from all relevant sectors. Trying to identify and include also the unusual suspects can contribute towards this direction.

The identification of the stakeholders from each part of the quadruple helix can be done based on their level of relevance with the objectives of the TSL using methodologies such as the influence/interest matrix. Relevance of stakeholders can be defined further by their potential role in the transition process as following: stakeholders important to secure feasibility, stakeholders involved at the implementation, veto stakeholders, stakeholders impacted by the implementation, stakeholders that operate as transition facilitators. This additional categorisation of the stakeholders can be implemented complementarily to the influence/interest matrix. If you have difficulties with identifying the relevant stakeholders, widen the scope of the TSL, as it is not always possible to estimate from the beginning which stakeholders will be relevant.

Also, a pre-identification of the role of each stakeholder in the transition process should be performed. It is recommended the stakeholders to be divided into broad role categories in a transformation process. Some indicative categories can be the following: stakeholders that have transition-enabling tools and transition-related data, stakeholders with capacity for conflict solving, implementers, conditions creators. The group of stakeholders should consist of both top-down and bottom-up participants to ensure a shared understanding of TSLs objectives that will take into consideration the broader regional policies and goals adjusted to the needs of the community. Also, the power relationships and dependencies (political, economic etc.) should be clearly identified as it is important to be aware of which stakeholders just need to be included because of such issues.

[15] TRANSFORMER Project, (2024). Deliverable 3.1 "Recommendations for Transition Super-Lab coalitions building, empowering of vulnerable and marginalised groups, and vision process", Available at: https://transformerknowledgehub.imet.gr/wp-content/uploads/2024/06/D3.1_Recommendations-for-Transition-Super-Lab-coalitions-building-empowering-of-vulnerable-and-marginalised-groups-and-vision-process_public.pdf

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The mapping of stakeholders' relations should be a dynamic exercise as different roles can become relevant in the course of TSL development or development of specific projects. It can be similar in case of their influence and interests, so it is important to monitor stakeholders within the map and make adjustments when necessary.

Gradual stakeholder engagement

The engagement of the quadruple helix stakeholders in Transition Super-Lab activities should be performed gradually as engaging all stakeholders simultaneously isn't feasible. As soon as their needs, interest and power are mapped, they can be approached in phases using the most appropriate channels per group of stakeholders. This enables the development of focused engagement actions and build trust over time establishing strong relationships that ensures long-term support for the TSL. As the TSL concept is an emerging approach, the different suggested processes may be faced with distrust and reluctance by the different stakeholders. A step-by-step approach in stakeholders engagement helps manage change more effectively, allowing stakeholders to adapt to new processes progressively.

Long-term civil society involvement

Involving civil society requires a long-term commitment and ongoing engagement. Consistency in outreach and activities is key to building trust and fostering meaningful participation. Citizens' empowerment to be active participants and adopters in the development and implementation of innovative solutions for the achievement of transition towards climate neutrality is critical. This can be achieved through tailored capacity-building programs, such as training and mentoring, supplemented by complementary learning materials and tools. Conversely, citizens first-hand knowledge should be channelled into action by others.

Adoption of collaborative online platforms to foster two-way communication with stakeholders

The adoption of tools associated with emerging digital technologies, such as collaborative online platforms is a widespread method for engaging the stakeholders. They facilitate dissemination of Transition Super-Lab activities, and live demonstrations of prototypes and services, thus reaching a broader audience. However, the benefits of such collaborative platforms should be communicated to stakeholders in advance to ensure their proper use. Creating space for dialogue, knowledge sharing, feedback collection and joint decision-making enhances buy-in and ensures the active participation of the stakeholders. Soliciting feedback and input from stakeholders ensures that diverse perspectives are considered and that proposed actions resonate with the needs and priorities of the target audience. The TSL is recommended to establish transparent mechanisms for regular reporting and updates on the progress of its activities to build trust and accountability among the stakeholders.

It is important to include quite in advance the advertisement of the online platforms in the communication strategy of the TSLs and set up a follow up strategy in order to ensure their proper use.

Establish regular communication channels with Stakeholders

Establishing regular communication with stakeholders to foster interaction and dialogue among stakeholders is crucial for sustaining momentum and fostering collaboration. Regular communication

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can be ensured by scheduled updates such as monthly reports delivered via emails and/or regular meetings to ensure consistent engagement. A dedicated workshop/series of workshops on how to communicate locally, adapt to the local needs the internal and external communication and how to localise all content should be foreseen mandatory for TSLs in order to improve efficiency and engagement of the communication strategy.

It is important to choose a mix of communication channels to reach different stakeholders effectively and communicate to them clear messages preventing misunderstandings and conflicts.

Localise and adapt the communication strategy to a granular level

Each region has its own national specificities when it comes to communication products and dissemination channels. There are differences in languages, experiences, level of maturity of solutions, local needs and specificities that should be considered from the start to help increase the engagement of local stakeholders. This way, the communication strategy should be fully personalised and adapted to the local specificities and therefore more adopted by the local stakeholders.

Increase training and information dissemination

The organisation of training and informative events on transition and climate-related topics for stakeholders in the quadruple helix model (government, academia, industry, and civil society) ensures that all stakeholders are well-equipped to contribute effectively to the TSL's initiatives, driving innovation, and achieving TSL's goal. Academic institutions can play a crucial role in these efforts by offering training and capacity-building programs to enhance stakeholders' skills and knowledge, enabling them to contribute more effectively.

3.6 Recommendations to increase the transition readiness of an ecosystem

According to the Transition Assessment Framework (see Deliverable D5.2), a transition-ready region should have a set of main characteristics (22 sub elements) that cover 6 elements including governance & fusion, openness & greenness, transparency and cross-sectorial collaboration, regulations and economy, infrastructure, technology & tools and civil society and stakeholders. A set of recommendations of how to increase the regional transition readiness level related to each of the sub elements are developed and presented in the following sections.

3.6.1 Governance and fusion

3.6.1.1 Inter-departmental coordination

Greater collaboration among all regional departments is key to enabling cross-sector transitions. This united approach allows departments to support each other as they pursue the common objective of climate neutrality. It's crucial for a region that wants to increase its transition readiness level to formally **integrate these collaborative activities among multiple departments into its strategy and Action Plan of achieving transition to climate neutrality**, ensuring in parallel that **the mission and the goals of each department are respected, and the roles are clearly defined**. By definition, a TSL benefits from a collaborative governance that can foster the inter-departmental collaboration

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accelerating the transformation towards climate neutrality through innovation and cross sectorial synergies.

3.6.1.2 Cross-sectorial planning

It is critical to ensure a comprehensive and holistic cross-sectorial planning approach that fosters collaboration, aligns policies, and promotes integrated solutions for addressing climate change challenges. For increasing the region's transition readiness level following the TSL approach, it is suggested to:

- ✓ **Establish cross-sectorial committees** and working groups that involve key stakeholders from different sectors such as energy, mobility, agriculture, industry etc. and facilitate regular meetings to discuss and coordinate climate strategies and to identify potential cross sectorial synergies.
- ✓ **Develop a clear vision** that aligns the goals across different sectors to avoid conflicts and promote mutual reinforcement.

3.6.1.3 Public Investments and subsidies

For increasing the region's transition readiness level in terms of Public Investments & subsidies following the TSL approach, it is suggested to:

- ✓ **Identify innovative financing mechanisms:**
  - Crowdfunding: Use crowdfunding platforms to raise funds for local climate projects, involving the community and generating wider support.
  - Green Bonds: Explore issuing green bonds to finance sustainable projects, attracting investors interested in environmental impact.

- ✓ **Seek external funding and partnerships:**
  - International Grants and Funding: Apply for grants and funding from international organizations, such as the United Nations, World Bank, the EU and other entities that support climate action.
  - Public-Private Partnerships: Foster partnerships with private sector companies to attract investments in sustainable infrastructure.
  - Private Sector Investment: Attract private sector investment by highlighting potential returns on investments in renewable energy, energy efficiency, and sustainable infrastructure.

3.6.1.4 Processes to identify conflict resolution

A region that would like to increase its transition readiness level by following the TSL approach should have a mature level of stakeholder analysis in order to be able to apply conflict resolution mechanisms to address potential disputes among cross sectorial stakeholders. Towards this direction the following steps are suggested:

- ✓ **Identify and map stakeholders** in each category of the quadruple helix (academia, public authorities, business and civil society) who will be impacted by or can impact the region's transition to climate neutrality, by using methodologies such as the influence/interest matrix and the stakeholders' salience model.
- ✓ **Prioritize the identified stakeholders** and classify them according to their potential role in the transition process using categories such as: important to secure feasibility, involved at the implementation, veto stakeholder, impacted by the implementation and transition facilitator.

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- ✓ **Conduct interviews** with the identified stakeholders, organize focus groups and/or send surveys to better understand their needs, expectations, and motivations.
- ✓ **Create value propositions** for each stakeholder group and apply conflict resolution mechanisms such as the Thomas-Kilmann Conflict Mode Instrument[16].

3.6.1.5 Political support

For increasing the level of political support for climate transition, a region is suggested to:

- ✓ **Identify and implement quick wins**: Develop quick wins to showcase the feasibility and benefits of climate initiatives in the short term, encouraging broader adoption.
- ✓ **Involve political leaders in the TSL coalition of stakeholders**: Engage with political leaders and decision-makers to present evidence and case studies that demonstrate the local benefits of climate action, aiming to shift their perspective and gain their support over time.

3.6.2 Openness and greenness

3.6.2.1 Openness

For increasing the openness level of the region through (inter)national synergies with neutral partners, it is suggested to:

- ✓ **Participate in international networks** and forums to share experiences and learn from other countries' cross-sectorial planning efforts.
- ✓ **Participate in cross-border projects** with other regions to share knowledge and experience.
- ✓ **Adopt and adapt successful models and best practices** from around the world to the local context.

3.6.2.2 Digitalisation

As digital transformation removes silos and allows stakeholders to collaborate into innovation creation, the integration of digital technologies and infrastructures transforms and improves the connectivity and value creation within the ecosystem. In this regard, for increasing the region's transition readiness level in terms of digitalization following the TSL approach, it is suggested to:

- ✓ **Invest in smart city infrastructure**, including IoT, data analytics, and digital services, to create an advanced urban environment conducive to cross-sectorial innovation.
- ✓ **Establish centralized databases and information-sharing platforms** that allow stakeholders from different sectors to access and share relevant data such as energy consumption, emissions data, land use, and transportation patterns. This will help stakeholders to identify potential cross-sectorial synergies but also will serve as an evidence basis for supporting the decision-making processes of the regional authorities.

3.6.2.3 Research and education

For increasing the region's transition readiness level in terms of Research & Education following the TSL approach, it is suggested to:

- ✓ **Promote and support joint research and innovation initiatives and projects** that involve multiple sectors, encouraging the development of technologies and solutions that address cross-sectorial challenges.

[16] The Thomas-Kilmann Conflict Mode Instrument (TKI) assesses stakeholder behavior, identifying strategies like Competing, Avoiding, Accommodating, Collaborating, and Compromising to select the appropriate resolution method (McPheat, S., 2022).

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- ✓ **Provide tailored capacity building** to policymakers, planners, and industry leaders on the importance of cross-sectorial planning and how to implement it effectively by using digital tools.
- ✓ **Develop educational and training programs and workshops** to build capacity in integrated climate action planning and execution and enhance the digital capabilities of people of every social background in order to utilize green digital solutions.

3.6.3 Transparency and cross-sectorial collaboration

3.6.3.1 Transparency and inclusiveness of processes

For increasing the region's transition readiness level in terms of Transparency and Inclusiveness of processes following the TSL approach, it is suggested to:

- ✓ **Promote citizen participation and social inclusiveness**
  - Establish citizen advisory committees for climate projects, ensuring diverse representation from different community groups to make every action towards the achievement of climate neutrality socially inclusive.
  - Use local media for disseminating TSLs actions and results of projects towards the achievement of climate neutrality.
  - Create platforms for collaboration between government, private sector, and civil society to co-design and implement climate initiatives.
  - Create feedback loops where citizens can provide input on TSL's government processes and projects, fostering continuous improvement.

- ✓ **Ensure data transparency**
  - Establish centralized open databases and information-sharing platforms for collecting relevant data on energy use, emissions, and climate projects from different sectors and making them available to the public.
  - Implement regular reporting mechanisms on climate actions and progress towards climate neutrality, ensuring data is accessible and understandable to the public.
  - To address the challenges of data sharing and reuse, apply the FAIR principles (a set of guidelines for making data Findable, Accessible, Interoperable, and Reusable).

3.6.3.2 Stakeholders' engagement and cross-sectorial initiatives and synergies

A region that operates through transparent processes enforces stakeholders' engagement in participatory approaches and provides fruitful ground for the development of cross-sectorial initiatives and synergies that aim to bring together the transition-related stakeholders from the quadruple helix to work towards common goals and solutions. Towards this direction, a region is suggested to:

- ✓ **Engage Stakeholders gradually**: Engaging all stakeholders simultaneously isn't feasible; instead, you can approach them in phases based on their interest, position, and influence. This approach enables focused engagement and customized communication. It's crucial to articulate requests clearly to stakeholders and provide them with unambiguous feedback.
- ✓ **Maintain Regular Contact with Stakeholders**: Establishing regular communication with stakeholders is crucial for sustaining momentum and fostering collaboration. It is important to remember that not all stakeholders can provide feedback simultaneously, so patience is

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key. Be prepared to wait for the right moment if necessary. It's also essential to stay flexible and avoid tying an initiative's progress to a single stakeholder's input.

- ✓ **Ensure a balanced representation** and participation of different societal groups (including marginalized groups)
- ✓ **Simplify participation processes** to ensure that stakeholders understand their roles without being overwhelmed. This approach facilitates broader participation.

3.6.4 Data availability and security

To ensure data availability and security, the region needs to establish a secure, trustworthy, and resilient digital infrastructure that collects data protecting its privacy through suitable methods and empowers end users to understand the added value of this data. A region that would like to increase its transition readiness level in terms of Data availability and security following the TSL approach, it is suggested to:

- ✓ **Establish centralized databases and information-sharing platforms** that allow stakeholders from different sectors to access and share relevant data such as energy consumption, emissions data, land use, and transportation patterns. This will help stakeholders to identify potential cross-sectorial synergies but also will serve as an evidence basis for supporting the decision-making processes of the regional authorities.
- ✓ **Create innovation hubs and collaborative platforms** where stakeholders from different sectors can work together on pilot projects and scaling up successful initiatives.
- ✓ To address the challenges of data sharing and reuse **apply the FAIR principles** (a set of guidelines for making data Findable, Accessible, Interoperable, and Reusable)

3.6.5 Infrastructure, technology & tools

3.6.5.1 Region Innovation Capacity

A region with high capacity for innovation is able to exploit existing knowledge, skills and resources creating a sustainable competitive advantage by driving innovation activities in a constantly changing environment towards the achievement of climate transformation. Towards this direction, a region is suggested to:

- ✓ **Establish centralized databases and information-sharing platforms** that allow stakeholders from different sectors to access and share relevant data such as energy consumption, emissions data, land use, and transportation patterns. This will help stakeholders to identify potential cross-sectorial synergies but also will serve as an evidence basis for supporting the decision-making processes of the regional authorities.
- ✓ **Initiate and promote training programs** to help region's management and technical staff develop their abilities in managing data and utilizing digital technologies.

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3.6.5.2 Sectorial Innovation

The high degree of risks and uncertainties due to technological complexity could be eliminated if the technologies are well embedded in sectorial innovation enabling the technological advancements and the development of cross-sectorial solutions. For increasing the level of its sectorial innovation, a region is suggested to:

- ✓ Identify and focus on sectors where the region has **existing strengths or potential for growth** and develop strategic partnerships with global leaders in these sectors to bring technology, and investment to the region.
- ✓ **Develop quick wins** projects to showcase the feasibility and benefits of climate initiatives in the short term. This creates a favourable investment environment as it creates added value for the big innovators and investors.

3.6.6 Civil society and stakeholders

3.6.6.1 Society's perception

The perception of society is a crucial factor that can influence the acceptance and effectiveness of climate initiatives. Therefore, a region is suggested to make efforts for understanding and positively influencing these perceptions by:

- ✓ **Using local media** for disseminating TSLs actions and results of projects towards the achievement of climate neutrality to encourage citizens to adopt new services and green solutions.
- ✓ **Enhancing the digital capabilities** of people of every social background through training programs to utilize green digital solutions.
- ✓ Educating citizens about the effects of their lifestyle, e.g. on air quality, can also motivate them to adopt more sustainable behaviours.

3.6.6.2 Raising society's awareness for environment

For increasing the level of society's environmental awareness, a region is suggested to:

- ✓ **Develop public engagement and awareness campaigns** to raise awareness among the public about the interconnected nature of climate issues and the benefits of cross-sectorial approaches.
- ✓ **Leverage Non-Governmental Organizations** (NGOs) and Civil Society: Collaborate with NGOs and civil society organizations that are already working on climate issues. These organizations can provide expertise, resources, and networks to support local initiatives.
- ✓ **Develop educational and training programs and workshops** to build capacity in integrated climate action planning and execution.

3.6.6.3 Knowledge dissemination to public

By fostering the diffusion of a shared vision and sustainable goals towards the achievement of climate neutrality, public awareness is enhanced. For ensuring an efficient knowledge dissemination to the public, a region is suggested to:

- ✓ **Engage communities in participatory planning processes** to ensure that local needs and perspectives are considered in cross-sectorial strategies and initiatives.
- ✓ **Organize informative events** on transition-related topics for the public. Academic institutions can play a crucial role in these efforts.

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3.6.6.4 Support from existing veto players (neutralisation of veto players)

A region that effectively engages and gain the support of veto players is able to achieve a smoother and more inclusive transition towards climate neutrality. Acquiring the support of veto players requires the following actions, among others:

- ✓ **Identify the veto players**, understand their interests, and create value proposition for them to ensure their long-term motivation to participate in the systemic transformation.
- ✓ **Use consistent and clear messaging** to explain to veto players the benefits of cross sectorial synergies to achieve climate neutrality and how it aligns with their interests.
- ✓ **Showcase results from successful projects and best practices** from other regions that have successfully transitioned to climate neutrality, highlighting lessons learned and positive outcomes.

Conclusions and Outlook

The Transition Super-Labs represent an innovative approach to fostering regional transitions towards climate neutrality and driving systemic transformation through a series of collaborative, innovative, and systemic methodologies. The following conclusions encapsulate the key findings and insights as described in the previous sections and offer a forward-looking perspective on their continued evolution and impact.

One of the most important conclusions extracted during the project is the critical importance of contextual relevance. Each region, with its unique socio-economic, political, and environmental characteristics, requires tailored strategies to effectively drive the transition to climate neutrality. Understanding and reflecting on the region is essential for the success of a Transition Super-Lab because it ensures that the TSL's initiatives are relevant, sustainable, and impactful. It fosters community engagement, aligns with local policies, supports economic development, and addresses environmental challenges. By being context-specific, the TSL can effectively drive a systemic transformation and innovation within the region. The diversity observed among the four regions involved in the TRANSFORMER project—Emilia-Romagna, Lower Silesia, the Ruhr Area, and Western Macedonia—underscores the need for adaptive and flexible approaches. Successful implementation of TSLs hinges on understanding and integrating local needs, capabilities, and challenges into the strategic planning and execution of transition activities.

Additionally, effective governance and active stakeholder engagement are pivotal to the success of TSLs. The collaborative governance model adopted by TSLs ensures that all relevant stakeholders, including government bodies, private sector entities, academia, and civil society, are actively involved in the transition process. This inclusive approach not only enhances the legitimacy and acceptance of TSL initiatives but also fosters a sense of ownership and commitment among stakeholders. The formation of strong coalitions and networks has been instrumental in mobilizing resources, aligning objectives, and facilitating the co-creation of innovative solutions.

Political and financial stability are essential for the sustained operation of TSLs. Mitigating political risks by focusing on technical aspects and diversifying funding sources can be proven effective in safeguarding TSL initiatives from political shifts and uncertainties. The proactive identification of

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diverse funding mechanisms, including international grants, public-private partnerships, and innovative financing models, along with a detailed business plan that outlines the vision, objectives, activities, and financial projections of TSLs are crucial in attracting funding from various sources and ensuring the financial sustainability of TSLs. The iterative development and continuous monitoring of TSLs' activities will be critical in ensuring that the TSLs remain responsive to emerging challenges and opportunities.

The dissemination of knowledge and capacity building are fundamental components of the TSL approach. By sharing lessons learned, best practices, and innovative solutions, TSLs contribute to the broader knowledge creation and support the continuous improvement of transition strategies. Training programs, workshops, and educational initiatives can be pivotal in enhancing the skills and knowledge of stakeholders, enabling them to contribute more effectively to TSL activities. The establishment of centralized data repositories and information-sharing platforms will facilitate the collection, analysis, and dissemination of valuable insights, thereby supporting evidence-based decision-making.

Looking ahead, the long-term implementation and sustainability of the TSLs will require ongoing adaptation and refinement of methodologies and approaches. Future research should focus on exploring new areas of innovation, enhancing stakeholder engagement strategies, and developing more robust mechanisms for monitoring and evaluating the impact of TSL activities. Additionally, there is a need to deepen the understanding of the systemic interactions and leverage points within regional transition processes. By addressing these research needs, TSLs can further enhance their effectiveness and contribute to the global effort to achieve climate neutrality.

In conclusion, the TSL approach has laid a strong foundation for regional transitions towards climate neutrality. The collaborative, innovative, and adaptive nature of TSLs has enabled them to address complex regional challenges and drive sustainable change. By continuing to build on the lessons learned and embracing new opportunities for innovation and collaboration, TSLs can play a pivotal role in shaping a sustainable and resilient future.

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