D5.1 Methodological Guidelines for WP5

Environmental Impact Assessment

TransScale

Scale-Up and Scale-Out Capacity for Urban Transformation.

Focus of Deliverable (D5.1)

This report is the result of T5.1 and presents the method for environmental assessment of Circular Sharing Economy initiatives in the Transscale project.

These guidelines are meant to communicate the content of the WP5 for the TransScale project and how data collection is carried out. The report should also be used a means for a collaborative process towards collecting data that accommodates Life Cycle Assessment and Social Practice Theory for later analysis.

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Reference

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Table of Contents

Introduction to the TransScale Project

The TransScale project, running from January 2024 to December 2026, aims to foster sustainable urban development by scaling up and scaling out Circular and Sharing Economy (CSE) initiatives. TransScale focuses on efficient resource use and emission reduction through innovative practices in urban settings.

The primary aim of TransScale is to explore and enhance the capacities needed for effective CSE initiatives, which involve sharing goods, infrastructure, and services to reduce emissions and optimize resource usage. The project will investigate material flows for various products like food, construction materials, furniture, clothing, and electronics to establish sustainable practices in recycling, reuse, repair and reduction.

For more information, please visit our official website: TransScale – Urban resource sharing and

Work Package 5 Description

This work package (WP5) specifically explores social practices involving a range of initiatives handling products such as food, clothing and electronics from a perspective related to the 4R's (i.e., Reduce, Reuse, Recycle and Recover). Life Cycle Assessment (LCA) methods are applied to evaluate the environmental impacts of the initiatives in WP5. Social Practice Theory (SPT) is used to identify and analyze citizens' social practices and their changes through participation in local CSE initiatives. Furthermore, WP5 includes comparative analysis of the different practice fields within the 4 hubs (i.e., Denmark, Latvia, Norway and Poland) to help identify important aspects of the societal context and infrastructures in CSE initiatives.

LCA offers data-driven insights into the environmental impacts of various interventions, which is combined with SPT, which helps identify and analyze the (changes in) social practices of the involved actors. Furthermore, SPT is used to assess the role of context and infrastructure in social practices and the changes herein. This combination is used to understand how participation in CSE initiatives influences environmental impacts and analyze the dynamics of change in a sustainable transition perspective.

By using LCA, the most environmentally impactful stages in the life cycles of materials, products and services involved in the CSE initiatives are assessed. SPT complements this by analyzing how social practices of different types of actors in the CSE initiatives contribute to these impacts and the changes herein. For example, if LCA identifies significant emissions in the use phase of a product or service, SPT can help understand the practices behind these emissions and enlighten possibilities for changes in practices to reduce impacts. Such findings can contribute to the development of recommendations for the initiatives in the four hubs.

Scaling Up and Out of CSE initiatives

Combined with analyses in other WP's, important aspects of societal context and infrastructures for scaling out and scaling up based on the CSE initiatives are analysed. These analyses can be powerful in the development of strategies for scaling CSE initiatives. Scaling out involves expanding successful practices to new contexts, while scaling up might imply formalizing these initiatives as part of sustainable transition of the involved social practices and material flows. LCA can quantify the environmental benefits of thscaling, SPT can ensure that the scaling respects and adapts to local practices and cultures.

Main Activities in WP5

Besides developing the method for environmental assessment of CSE initiatives, WP5 has four other tasks:

- **T5.2:** Baseline assessment of initiatives.

- **T5.3:** Midterm environmental assessment.

- **T5.4**: Final environmental assessment and assessment of future potentials.

- **T5.5:** Development of guide for environmental assessment of the CSE.

T5.2 - T5.4 are activities conducted as part of WP5 during the period where the CSE initiatives in WP2 are studied.

The Methodological Approach in Relation to the Activities

Baseline Assessment (T5.2):
For the Baseline Assessment we see the benefit of mapping the baseline resource flows and conducting interviews to identify the current state of social practices and their environmental impacts, which are relevant for the CSE initiatives in the different hubs. This can help understand the societal context and infrastructure around the CSE initiatives. We therefore want to:

- Conduct LCA to assess the current environmental impacts of selected CSE initiatives.

- Use SPT to understand the existing social practices and identify possibilities for changes that could lead to reduced impacts.

- From a Sustainable Transition perspective analyze the institutional and systemic conditions that (could) support or hinder the CSE initiatives (this part will be combined with the analyses of societal context in WP3).

Midterm Assessment (T5.3):

The midterm environmental assessment involves mapping midterm resource flows and identifying changes in the resource flows and changes in the related social practices through interviews and surveys. This step helps assessing the environmental potential and challenges of CSE initiatives as they evolve. We therefore want to:

- Reassess environmental impacts using LCA to capture changes from baseline.

- Use SPT to document changes in social practices and identify new 'competencies' and 'meanings' that have emerged and how they are related to specific 'materials' such as infrastructure.

- From a Sustainable Transition perspective identify important aspects of societal context and infrastructures in the CSE initiatives.

Final Assessment and Future Potentials (T5.4):

The final environmental assessment and assessment of future potentials builds on the previous assessments to map changes from the baseline and midterm status, identifying future environmental potential from scaling up and scaling out the analyzed CSE initiatives. This could involve coordination with policy analyses (e.g., from WP3) to understand the broader implications of CSE initiatives as part of sustainable transition dynamics). We therefore want to:

- Perform final LCA's to quantify the environmental obstacles and/or benefits of the initiatives.

- Use SPT to analyze the potential stabilization of new practices and their integration into daily life.

- From a Sustainable Transition perspective develop scenarios for future scaling up and out, identifying necessary policy and institutional changes to support broader adoption.

Development of guide for environmental assessment of the CSE (T5.5.):

Based on the experiences from T5.2, T5.3, T5.4, a guide is developed for the environmental assessment of local CSE initiatives. The guide will focus on planning, organizing, adjusting and embedding future CSE initiatives in cities, including how changes in resource flows and social practices can be mapped and assessed without the need for big economic resources.

Theoretical Background of the Methodology

Social Practice Theory

Social Practice Theory (SPT) focuses on the everyday practices of individuals and communities, examining how these practices are shaped by and shape social norms, cultural meanings, and material infrastructures (Shove et al., 2012). SPT can provide insights into how CSE initiatives influence citizens' social practices and behaviors. This includes understanding how participation in CSE initiatives affects consumption patterns, waste generation, transportation choices, and other aspects of everyday life.

The SPT framework is particularly relevant for our study because it provides a means of uniting studies of innovation and consumption while conceptualizing the dynamic processes inherent in CSE initiatives.

Drawing on inspiration from philosophers Wittgenstein and Heidegger, SPT shifts the focus to practice as a central stage, rather than a mere passage between social structures and human subjects (Shove et al., 2012). Subsequent scholars, such as Schatzki (2012), have also developed on this theorization by describing practices as organized constellations of different people's activities, emphasizing that practices are rooted in collective human activity rather than individual actions.

Reckwitz (2002) describes SPT as behavior that is routinized, where mental routines and knowledge are integral parts of the practice. His perspective focuses on the forms of bodily and mental activities, as well as the roles of objects, know-how, emotions, and motivational knowledge within practices. Although there are nuanced differences in how Reckwitz (2002) and Schatzki (2012) theorize SPT, they agree on the intrinsic connection between practices and objects. Shove et al. (2012) integrate these perspectives into their framework, which includes routines, activities, and objects as fundamental components of SPT.

From Shove et al.'s (2012) perspective, SPT involves systematically exploring processes of transformation and stability within social practices and between them. This approach allows us to analyze the complex and intangible nature of dynamics within practices in a tangible manner, which is critical for understanding how CSE initiatives influence citizens' social practices and their environmental impacts.

Practice-as-Performance and Practice-as-Entity

Social Practice Theory (SPT) suggests an analytical distinction between practice-as-performance and practice-as-entity (Shove et al., 2012). Practice-as-performance refers to the observable behavior of individuals, such as participating in CSE initiatives, while practice-as-entity encompasses the enduring structures and meanings that underpin these activities (figure 1). For instance, in the context of urban CSE initiatives, practice-as-performance could include the actions of citizens engaging in recycling or sharing activities, whereas practice-as-entity includes the broader cultural

and infrastructural context that encourage and enable these behaviors.
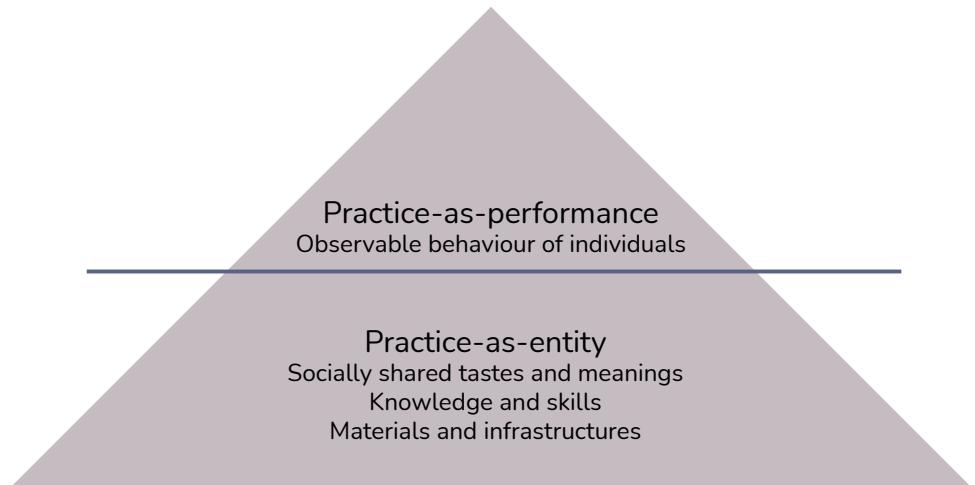
Figure 1: Practice-as-performance as the tip of the iceberg vs. Practice-as-entity (Markussen et al., 2021).

Elements of Practices

Shove et al. (2012) present a model of three elements of practice: materials, competence, and meanings (figure 2).
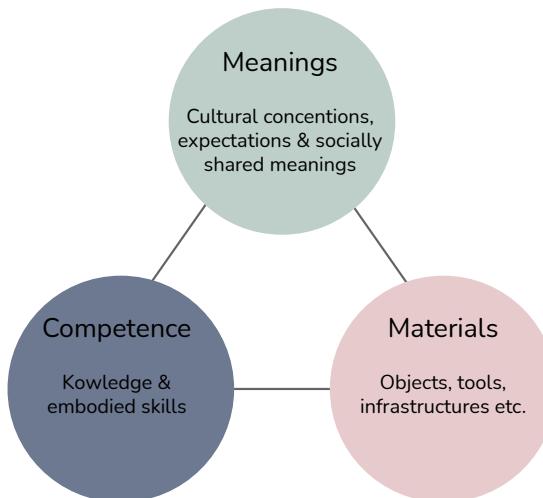

Figure 2: Representation of the three elements of a practice (Markussen et al., 2021 based on Shove at 2012).

These elements emphasize the components of practices: cultural conventions, expectations, and socially shared meanings constitute the element of **meanings**; objects, tools, and infrastructures constitute the element of **materials**; and knowledge and embodied skills constitute the element of **competence** (Shove et al., 2012).

These social arrangements that constitute a practice are dynamic processes, which are mutually shaping each other (Shove et al., 2012). As an example, changes in a CSE can lead to a continuous process of reciprocal adaptation of the three elements of social practice. For example, the wish of citizens to get more products repaired can lead to the development of new initiatives among citizens and shift societal values towards sustainability. This helps us define practices by showing how elements are integrated when practices are constituted. Practices change as these elements are introduced and combined in various ways. It is possible for the same element to existent in dif-

ferent practices, thus performing an interrelation between practices (figure 3).
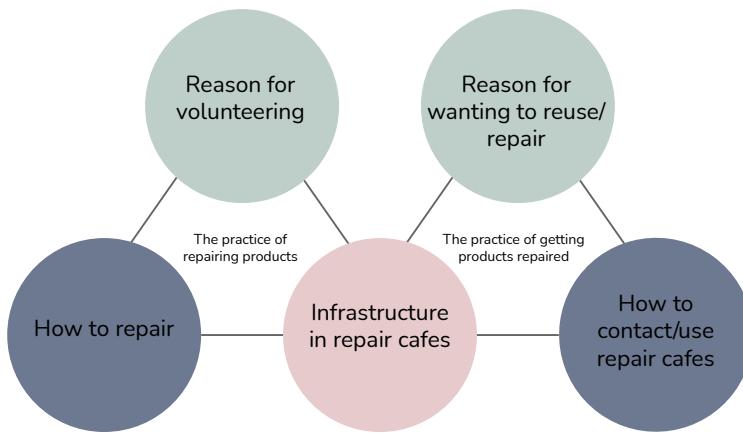

Figure 3: Example of interrelated practices within repair cafes (generalized example).

These interrelations of shared elements are bridging practices across individuals (Shove et al., 2012). This is because, in SPT, human actors are not the central focus; instead, the emphasis is on the actions of these practitioners who reproduce the practices in which they engage and the elements of which these practices are made (Shove et al., 2012). This means that individuals function as "carriers of practices" (figure 4).
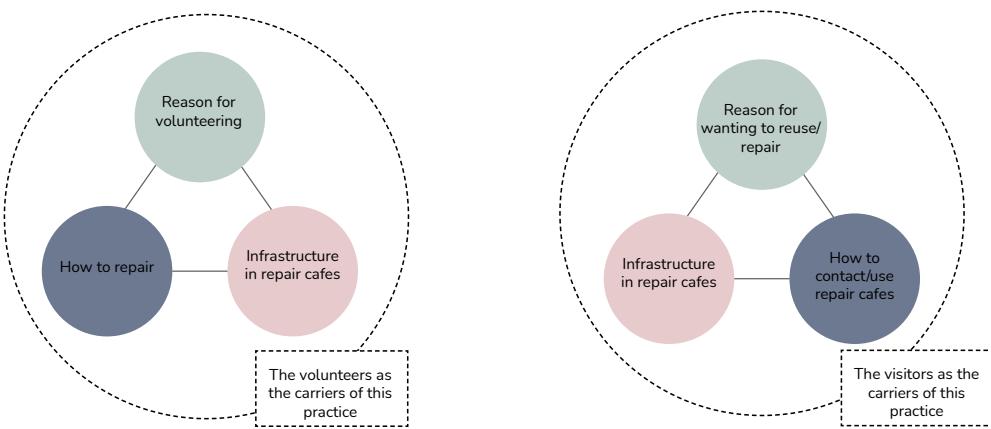
Figure 4: People are carriers of practices (generalized example with repair cafes)

Interactions between elements

Just as the same element can exist in multiple practices, elements can exist without being connected at all. Shove et al. (2012) refers to this as proto-practices (figure 5). New practices are formed as elements connect and when they fall apart and the connections are broken, they turn into ex-practices (Shove et al., 2012) (figure 5).
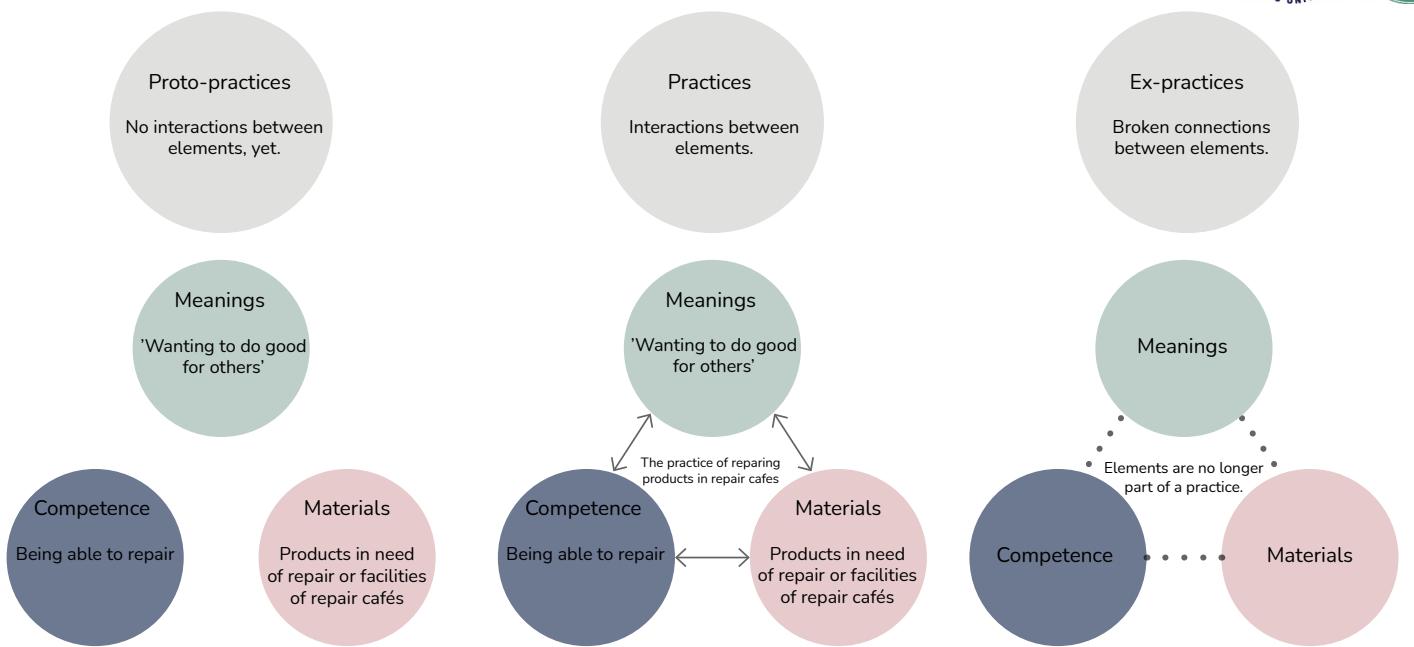
Figure 5: A generalized example of a proto-practice, an established practice and an ex-practice inspired by Shove et al (2012).

This concept is crucial for understanding how new practices emerge and how existing practices dissolve. For example, the introduction of new CSE initiatives can lead to the formation of new practices as citizens adopt new routines and skip old ones. It is thus the time perspective that is important when working with practice theory. When someone wants practitioners to adopt a new practice it is relevant to look at which elements are needed for that new practice to unfold; should existing elements be connected in new ways? Are there existing practices that need refinement? How can old practices shape the new and more desirable practice? In the same way, the time perspective is useful to understand how and why exiting practices are constituted as they are. What made the practice meaningful? What elements are important? And so on.

The elements of practice (materials, competence, and meaning) circulate in different ways (Shove et al., 2012). The circulation of materials involves the physical movement and availability of objects, such as recyclable materials in CSE initiatives. Competence circulates between people and practices, requiring abstraction for it to be transferred and applied in different contexts (Shove et al., 2012). Meanings circulate through dynamic processes of association, influenced by societal interactions and participation in various practices and social norms (Shove et al., 2012). For instance, the meaning of sustainability can extend and evolve as more citizens engage in CSE initiatives, reinforcing the importance of environmental governance.

Patterns Showing Bundles and Complexes

Practices are furthermore interconnected through inter-practice relations, forming bundles and complexes (Shove et al., 2012). Bundles are loose-knit patterns based on the co-location and co-existence of practices, while complexes are more integrated and interdependent (Shove et al., 2012). This means that practices have inter-relations across people (figure 3). Recognizing these

inter-practice relations is essential for understanding how CSE initiatives interact with and influence other social practices. For example, the practice of getting products repaired may interlock with the practice of gathering new information creating interconnection to the practice of making friends (figure 6).
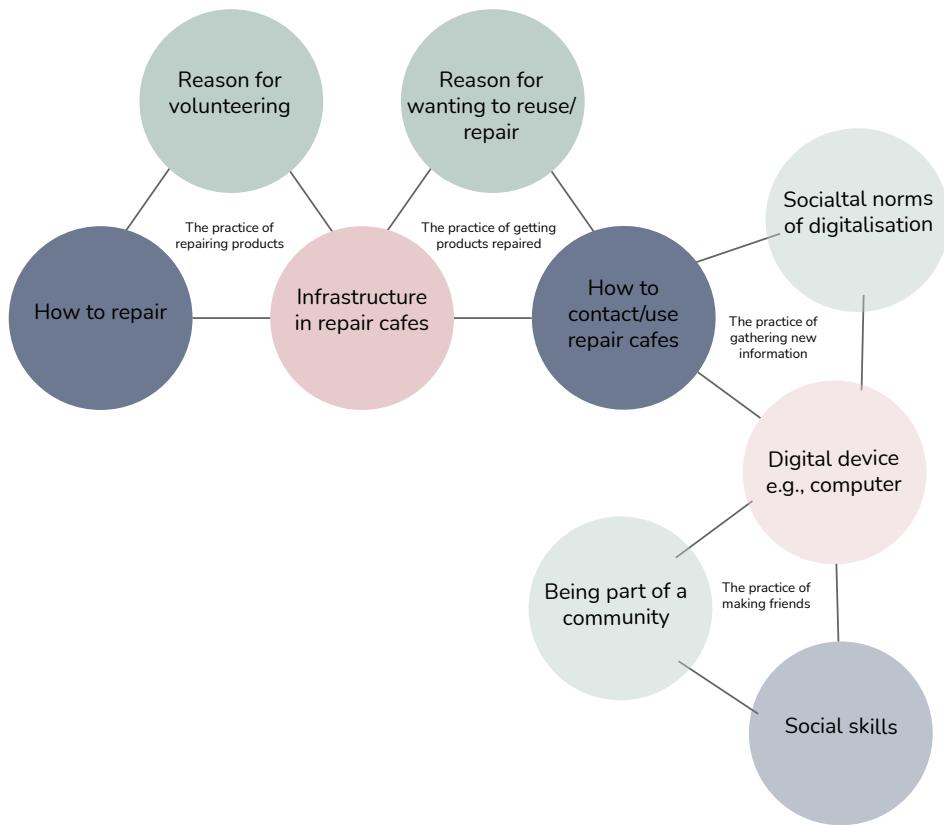
Figure 6: Example of a bundle-of-practices for repair cafes (generalized example)

Understanding this complex pattern is interesting, when looking at the perspective of scaling up and scaling out the CSE initiatives, because the reason for individuals becoming 'carries of (desirable) practices' are affected by not only their own bundle-of-practices, but also other practices across other people (and institutions).

By applying Social Practice Theory to the study of CSE initiatives, we can gain a comprehensive understanding of how these initiatives influence social practices and environmental impacts. The theoretical framework allows us to systematically explore the dynamics of practices and their change, the interconnections between them, and the role of context and infrastructure. This approach could provide valuable insights for developing effective and sustainable guidelines for scaling up and scaling out CSE initiatives that can transform urban environments and promote environmental sustainability.

Life Cycle Assessment

Life Cycle Assessment (LCA) provides a systematic framework for identifying and quantifying environmental impacts associated with a product or service. LCA can be used to assess the environmental impacts of local Circular and Sharing Economy (CSE) initiatives. It is a quantitative method, focusing on relevant products and materials. This involves quantifying resource use, energy consumption, emissions, and other environmental indicators associated with the life cycle stages of these products and materials (Bjørn, Owsianiak, et al., 2018).

LCA is a valuable tool for sustainability assessment and supporting decision-making. By understanding the environmental impacts of different options, it is possible to identify opportunities to reduce resource consumption, minimize pollution, and improve overall environmental performance (Bjørn, Laurent, et al., 2018). LCA can also inform product design, supply chain management, and policy development to promote more sustainable practices. The assessments in TransScale will be made in the program SimaPro by AAU in cooperation with the national project hubs.

The Four Main Phases in Conducting an LCA

Goal and Scope Definition:
This phase involves clearly defining the goal of the assessment and the scope of the study, including the functional unit (i.e., the unit of analysis), system boundaries, and the life cycle stages to be included (Bjørn, Laurent, et al., 2018).

Life Cycle Inventory (LCI):
In this phase, data on all inputs (e.g., materials, energy and so on) and outputs (e.g., emissions, waste and more) associated with each life cycle stage are collected and compiled. This step often involves creating a detailed inventory of resource use and emissions (Bjørn, Moltesen, et al., 2018). The LCI data are then used to evaluate the potential environmental impacts associated with the product or process.

Life Cycle Impact Assessment (LCIA):
LCIA involves assessing various impact categories such as climate change, human health, ecosystems, and resource depletion (Hauschild, 2005). This step helps identify which environmental issues are most significant in the given context.

Interpretation:
Finally, the results of the LCA are interpreted to draw conclusions and make recommendations based on the findings (Hauschild et al., 2018). This phase involves identifying opportunities for improvement, comparing alternative scenarios, and communicating the results to stakeholders and planning strategies for changes (Hauschild et al., 2018).

Implications for a Sustainable Transition

Sustainable Transition Theory (STT) offers a robust framework for understanding and facilitating the shift towards more sustainable socio-technical systems. This theory explores the intricate interplay between social, technical, and institutional elements that influence sectors like energy, transportation, and waste management. By examining the potentials and barriers from both path dependency and path creation perspectives, STT provides insights into how existing institutions can enable, hinder, or shape changes in social practices.

The objective in Transsscale is to explore how transformations within socio-technical systems can foster more sustainable practices and outcomes. STT focuses on the systemic changes required for sustainable changes, emphasizing the interactions between technological innovations, institutional frameworks, and social practices. This approach helps identify the pathways, barriers, and enablers for large-scale transitions towards sustainability.

For instance, consider a scenario where LCA- and SPT-analyses highlight the environmental benefits of a city-wide repair program. An analysis based on STT would help guide the implementation of this program. It would address the necessary regulatory changes, infrastructural investments, and stakeholder engagement strategies to ensure the program's success. By doing so, STT can be used to ensures that strategies for realizing the environmental potential can be developed and thereby support a comprehensive approach to sustainable transitions.

In summary, integrating STT with LCA and SPT allows for a holistic analysis of the environmental and social impacts of CSE initiatives. This combined approach ensures that the technical feasibility and environmental benefits of these initiatives are supported by appropriate systemic changes, leading to sustainable and scalable solutions across different urban contexts.

Case Studies and Data Collection

Before you as caseholder in one of the 4 hubs start to read the following, it is important to point out that this document serves as a means of preparing you for the data collection. As you engage in collecting empirical data from your respective cases, understanding the essence of Life Cycle Assessment (LCA) and the use of Social Practice Theory (SPT) is important. While you may not be the one performing the calculations related to LCA yourself, your knowledge about its principles and processes will significantly enhance the quality and relevance of the data you gather.

In summary, the previous sections have provided you with the foundational knowledge of LCA and SPT enabling you to effectively contribute to the data collection process. By reading it, you have helped ensure that the subsequent analysis is robust and meaningful, ultimately supporting our collective goal of scaling up and out the circular economy initiatives.

Cases

- (Norway) Municipality-driven reuse and repair unit (Omigjen - Asker municipality)

- (Poland) Food Waste Reduction and Prevention (Poznan)

- (Latvia) Riga Central Market with 3 branches

- (Denmark) Local development planning: Climate action plan - Municipality of Copenhagen

- (Denmark) Product longevity with Repair Café Denmark

Time perspective

To understand whether the initiatives change or enable change over time (change in social practices and change in emissions), a period of at least **2 weeks** pr. assessment (baseline, midterm and final) must be used to collect the (same) data. The collection period will make it possible to compare the three assessments within each initiative.

In order to make the process of collecting the data in the case studies more tangible, we have connected it to the activities in WP2. This means that some of the data needed for WP2 and WP5 can be collected together (e.g., in the same interview). Figure 7 shows the timeline for the data collection period (Blue boxes), the WP5 consists of three assessments, meaning we need three assessment periods. This has to take place within a minimum of 2 weeks or longer.
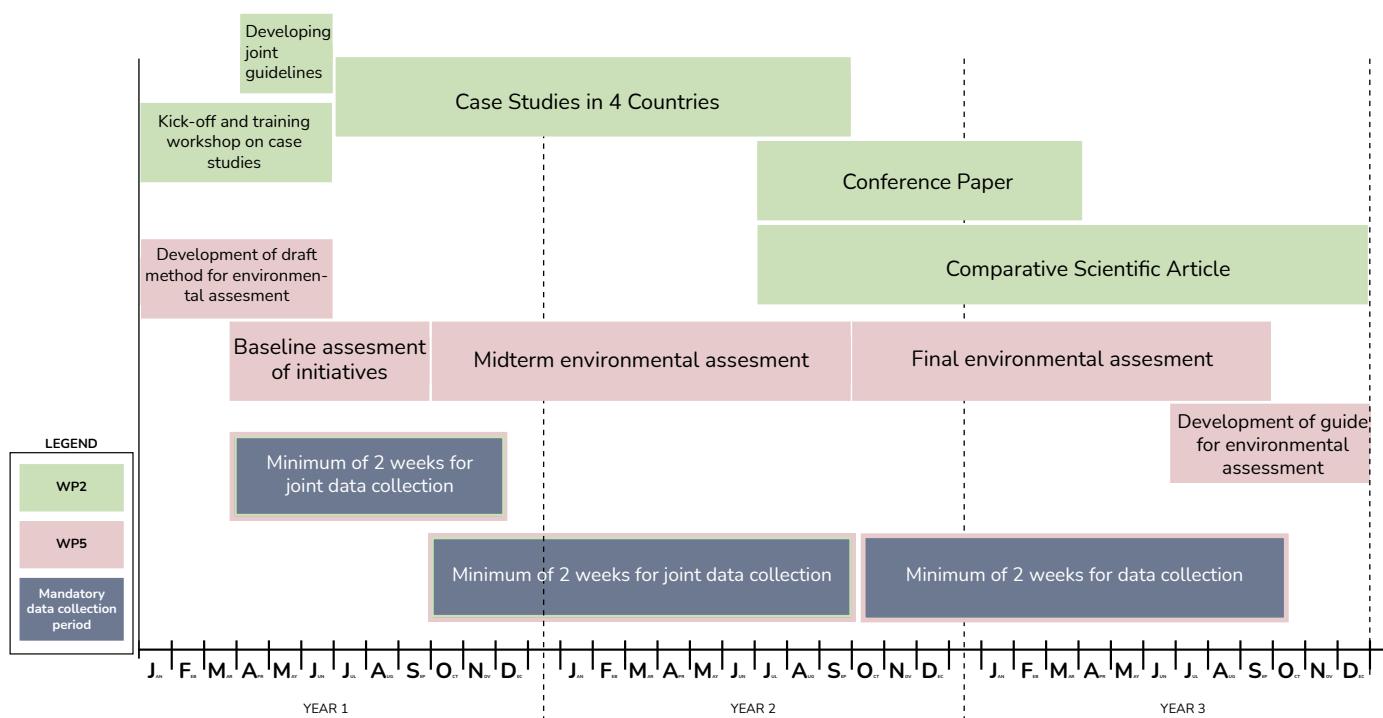

Figure 7: Timeline showcasing the data collection periods of WP2 and WP5.

Responsibilities

Each consortium partner has the person months presented in table 1.

Project Partner Number	1	2	3	4
Project Partner Short Name	BA	NIFU	AMU	AAU
Person months per applicant	1,5	1,5	1,5	9

Table 1: Project Partners Months.

The activities contains of a vast collection of both quantitative and qualitative data. AAU will help the local hub partners make the LCA based on the (quantitative) data you provide. To facilitate a thorough and transparent analysis, all (qualitative) data should be made available in its raw form. This includes audio recordings, transcriptions, and field notes. We encourage the recording of interviews to ensure detailed and accurate data collection. This raw data will serve as the foundation for the qualitative analysis, allowing for an in-depth examination of the social practices and interactions that drive the CSE initiatives.

Type of Informants

When conducting the research, it is important to include various stakeholders, such as visitors, employees/volunteers, institutions, policy stakeholders and other relevant actors.

Overview of Themes for Data Collection

Product/material flows

- Products or materials in focus in the specific initiative (type; amount)

- Resources for running the activities, like packaging, electricity, water, etc.

Operational data

- What mechanisms and organizational and physical infrastructures make the initiatives work?

- Number of visitors, employees and other relevant beneficiaries.

Waste related data

- Current waste management knowledge and practices.

- Waste prevention practices.

Infrastructure and the facilities (buildings) for the infrastructure

- What infrastructure sustains the service of the initiative, including physical infrastructure used by the initiative (buildings, other types of equipment, etc.).

- Which physical places are required for the initiatives to be successful (including the location of the initiatives)?

Transportation

- How are the products/materials being transported to and from the initiative?

- How are the transportation practices of the beneficiaries (visitors, employees etc.)?

Social Practice Data

- What practices of citizens, volunteers and staff are involved? (Practice-as-performance)

- What are the constitutes the three elements of the practices? (Practice-as-entity)

- How are the practices interlinked with other practices?

Expected Data Collection Methods

In-depth Interviews

To collect detailed qualitative data, you should conduct semi-structured interviews with key stake-holders. Prepare a set of core questions that guide the conversation but remain open to following up on interesting points that arise (use table 2 as a guide). These interviews should aim to uncover actors' perspectives, experiences, and roles within the initiatives. Ensure you record and transcribe these interviews for later detailed analysis.

Participant Observation

You should immerse yourself in the daily activities and interactions of the initiatives to gather data through participant observation. As an example, you could attend meetings, events, and routine operations, taking detailed notes on the practices, interactions, and changes you observe. Focus on capturing the context and subtleties of how the initiatives operate and how participants engage with them (Observe the 'practice-as-performance').

Measurements of Product/Material Flows

You should measure the flows of goods and materials within the local hubs to be able to evaluate the environmental impact of the initiative. Track the quantities and types of products and materials at various stages. Maintain accurate records of these measurements to support the environmental assessment process. AAU can support the planning of the necessary data collection in relation to products and materials that in focus of the specific initiative.

Data Collection for Life Cycle Inventory (LCI)

In order to create the necessary background for conducting the relevant Life Cycle Assessment (LCA) within each initiative, the hub partners should collect the earlier mentioned data in relation to the products and materials involved in the initiatives to ensure the best possible environmental impact assessments.

Data Collection Methods (EXTRA)

Participatory Workshops

You could organize participatory workshops to engage stakeholders in discussing and reflecting on the initiatives. Document the discussions, group activities, and outcomes comprehensively. Use these workshops to gather diverse viewpoints and generate collective insights into the challenges and successes of the initiatives. This is inherently what is expected in WP2.

Surveys

For the Danish case we will design a detailed survey to be distributed in Denmark, aimed at collecting quantitative data on demographic information, attitudes towards CSE initiatives, and reported practices related to resource use and waste management. The Polish partner will try to obtain external funding to conduct similar surveys in Poland.

Questions and Data Points

The overall aim of WP5 is to analyze the following aspects of the CSE initiatives:

How can scaling up and scaling out circular economy initiatives stimulate reduction in material flows?

What are the possible side effects of scaling up and scaling out the CSE initiatives?

The following questions (table 2) are to be used as reference or inspiration in the data collection in WP5; it is not mandatory to ask the questions as specifically written here, although we expect your data to be able to at least answer these questions.

NOTE: In WP5, we have yet to focus specifically on the potential side effects of scaling up and scaling out CSE initiatives. These side effects could include rebound effects or aspects of social justice. Rebound effects might involve an increase in resource consumption due to the scaling of initiatives, or significant resource use associated with reusing small quantities of materials, especially if the turnover in an initiative is low. Addressing these aspects requires a thorough foundation for such analyses, which Social Practice Theory (SPT) can partly provide.

Data Type (theme)	Questions to be asked	Data Points to Consider
Product/material flow	What are the specifications (composition, dimensions, packaging) of products and materials sold, donated, repaired or reused within the initiative?	Composition details, dimensions, packaging types.
	What are the quantities of products sold, donated, repaired or reused, and materials used by the initiatives over a specific period?	Sales records, usage logs.
	How many items and materials are diverted from waste management to the initiative over a specific period?	Diversion statistics, time frames.
	What are the quantities and types of waste generated and what disposal methods are used (recycling, incineration, landfill, etc.)?	Waste categories, volumes, disposal methods
	What are the details on the packaging materials and storage containers used in initiatives?	Types of packaging, storage containers, materials used
Operational data	What is the energy and water consumption within the operations?	Utility bills, energy and water consumption records.
	What are the details of the operational setup, including opening hours, number of visitors, and service rates?	Operational schedules, visitor counts, service rate metrics.
	What energy sources are used for lighting, heating, and other resources (e.g. water) within the shops and units?	Types of energy sources, energy consumption records.
	What are the details of unit operations, including inventory management and storage capacity?	Inventory logs, storage capacity data.
	What is the volume and types of beneficiaries using the initiatives.	Beneficiary records, service logs.
	What collaborations exist with private operators for refurbishment, waste, stock-up and/or other operations?	Partnership agreements, collaboration details.

Data Type (theme)	Questions to be asked	Data Points to Consider
Waste	What are the current disposal methods for waste generated at and by the initiatives?	Waste disposal methods, recycling processes.
	If possible: What is the quantitative data on the amount and types of waste at various stages of the supply chain (production, distribution, consumption)?	Waste volume data, waste type categories, supply chain stages.
	What are the waste management practices in place, such as waste collection frequency and separation initiatives?	Waste collection schedules, separation processes.
	What data exists on past waste management projects and flows?	Historical waste management data, project reports.
Infrastructure/ building	What are the details of infrastructure of the CSE initiative, including whether it was built or refurbished for the purpose, and what building materials, construction methods, and maintenance practices were used?	Infrastructure specifications, construction details, maintenance records.
	What ongoing maintenance or expansion is needed for the infrastructure?	Maintenance logs, expansion plans.
	What are the refurbishment details of the infrastructure, including building materials, construction methods, and maintenance practices?	Refurbishment records, building materials, construction techniques.
	What are the details of the infrastructure supporting food sharing units, including facilities for food storage, distribution, and collection?	Facility specifications, storage and distribution facilities.
	What is the availability and accessibility of infrastructure resources (e.g., refrigeration facilities, transportation networks)?	Resource availability data, accessibility records.

Data Type (theme)	Questions to be asked	Data Points to Consider
Transportation	What transportation modes are used by visitors, suppliers, volunteers, staff, etc. to access the initiatives?	Transportation mode data, visitor and vendor transport records,
	What transportation distances and modes are used for deliveries to the initiatives?	Delivery distance records, transport modes.
	What are the transportation distances and modes used by the employees?	Employee transport data, commuting distances.
	What transportation modes and distances are used by visitors to access the initiatives?	Visitor transport logs, distance metrics.
Operational data	What are the behaviors, preferences, and attitudes toward sustainability among visitors, participants and vendors?	Survey results, behavioral studies, observations, preference data.
	What (if any) feedback and engagement metrics are related to initiatives promoting circular economy principles?	Engagement metrics, feedback forms.
	What (if any) feedback and engagement metrics are related to community engagement?	Community feedback, participation rates.
	What cultural factors facilitate sharing- and circularity-oriented practices?	Cultural influences, societal norms.
	Which 'meanings' (SPT) do practitioners relate with the social practices of the initiatives?	Meaning attributed to practices, symbolic values.
	What kind of practical knowledge is necessary to facilitate CSE initiatives and/or practices?	Required skills, technical expertise, Competencies needed, skill sets.
	What 'materials' (SPT) take part in the practice/practices that involves the initiatives?	Material aspects, tangible resources. (e.g., a website, a cashier etc.)

Table 2: Questions to ask for WP5

Concluding Remarks for Analysis

The analysis of the collected data will be conducted through a co-production process led by the research team at Aalborg University (AAU). This approach will integrate scenario modeling, using Life Cycle Assessment (LCA) calculations, with qualitative data analysis based on Social Practice Theory (SPT) to ensure a comprehensive and participatory examination of the data.

Our analytical process will emphasize collaboration, engaging each consortium partner in the co-production of knowledge. The AAU team will facilitate scenario modeling to generate outputs that incorporate diverse perspectives and explore potential future pathways for Circular and Sharing Economy (CSE) initiatives. This modeling will not only help assess the environmental impacts but also assess the scalability of these initiatives under various conditions.

Qualitative data analysis will complement the scenario modeling by providing a nuanced understanding of the social practices and contextual factors influencing the CSE initiatives. Through this interactive approach, we aim to produce a holistic analysis that captures both the quantitative environmental impacts and the qualitative social dynamics at play.

By combining LCA with collaborative qualitative analysis, we strive to provide a robust framework for understanding and enhancing the sustainability of CSE initiatives. This dual approach will facilitate a deeper insight into the potential benefits and challenges associated with scaling up and scaling out these initiatives across different urban contexts
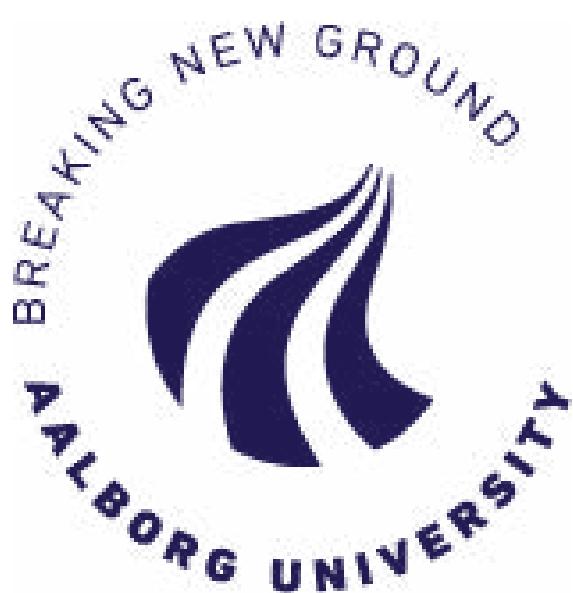
References

Bjørn, A., Laurent, A., Owsianiak, M., Olsen, S.I. (2018). Goal Definition. In: Hauschild, M., Rosen-baum, R., Olsen, S. (eds) Life Cycle Assessment. Springer, Cham. https://doi.org/10.1007/978-3-319-56475-3_7

Bjørn, A., Owsianiak, M., Molin, C., Laurent, A. (2018). Main Characteristics of LCA. In: Hauschild, M., Rosenbaum, R., Olsen, S. (eds) Life Cycle Assessment. Springer, Cham. https://doi.org/10.1007/978-3-319-56475-3_2

Hauschild, M. Z. (2005). Assessing environmental Impacts in a Life-Cycle Perspective. Environ-mental Science & Technology, 39(4), 81A-88A. https://doi.org/10.1021/es053190s

Hauschild, M.Z., Bonou, A., Olsen, S.I. (2018). Life Cycle Interpretation. In: Hauschild, M., Rosen-baum, R., Olsen, S. (eds) Life Cycle Assessment. Springer, Cham. https://doi.org/10.1007/978-3-319-56475-3_12

Markussen, T., Petersen, S. B., & Kronby, H. (2021). Moving Towards Individualized Work Models. Aalborg Universitet.

Reckwitz, A. (2002). Toward a Theory of Social Practices: A Development in Culturalist Theorizing. European Journal of Social Theory, 5(2), 243–263. https://doi.org/10.1177/13684310222225432

Schatzki T.R. (2012) A Primer on Practices. In: Practice-Based Education. Practice, Education, Work and Society, vol 6. SensePublishers, Rotterdam. https://doi.org/10.1007/978-94-6209-128-3_2

Shove, E., Pantzar, M., & Watson, M. (2012). The dynamics of social practice: Everyday life and how it changes. SAGE Publications Ltd, https://www.doi.org/10.4135/9781446250655