![TransScale logo — Sharing for Sustainability, Scaling Solutions]

D5.2 Baseline Environmental Impact Assessment

Report of the TransScale CSE initiatives

TransScale

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

Focus of Deliverable (D5.2)

This report is the result of T5.2 and presents the baseline environmental assessment of the four circular and sharing Economy initiatives in the Transscale project.

This report presents an analysis of circular and sharing economy (CSE) initiatives as part of the TransScale project, work package 5 – Environmental Impact Assessment. The report draws on Social Practice Theory and Life Cycle Assessment in assessing sustainability impacts. The document follows WP5 methodological guidelines (D.5.1) to establish a baseline assessment of four CSE initiatives across different contexts in Denmark, Norway, Latvia and Poland, highlighting key aspects of practices, data collection methods, and environmental evaluation (Markussen, Dorland, & Jørgensen, 2024).

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Lead Partner: Department of Sustainability and Planning, Aalborg University, Copenhagen.

Participating Partners: NIFU, BA, AMU.

Contact Person: Michael Søgaard Jørgensen, AAU, email: msjo@plan.aau.dk

Reference

Abstract

This report presents an analysis of circular and sharing economy (CSE) initiatives as part of the TransScale project, work package 5 – Environmental Impact Assessment. The report draws on Social Practice Theory and Life Cycle Assessment in assessing sustainability impacts. The document follows WP5 methodological guidelines (D.5.1) to establish a baseline assessment of four CSE initiatives across different contexts in Denmark, Norway, Latvia and Poland, highlighting key aspects of practices, data collection methods, and environmental evaluation (Markussen, Dorland, & Jørgensen, 2024).

1. Introduction

Authors: Tanja Markussen[1], Jens Dorland[1], Michael Søgaard Jørgensen[1], Julie Landboe-Christensen Hvid[1]

1) Department of Sustainability and Planning, Aalborg University, Copenhagen, Denmark

1.2 TransScale-Project Description

The TransScale project investigates the conditions under which Circular Sharing Economy (CSE) initiatives can scale up and scale out effectively. By identifying key factors influencing their sustainability, the project provides a framework for evaluating and expanding community-based resource-sharing models across diverse geographical and cultural contexts.

1.2.1 Scaling Up and Out the CSE Initiatives

Scaling up refers to integrating CSE initiatives into institutional frameworks, embedding them in policies, and expanding their infrastructure to support growth. Scaling out, on the other hand, involves replicating successful initiatives in different locations, adapting them to new socio-economic environments while maintaining their core principles. This distinction is crucial for assessing the feasibility of expanding the CSE initiatives without compromising their community-driven character. Scaling Up and/or Out can happen simultaneously or independently and can relate to different strategies for scaling a CSE initiative.

1.3 WP5 Guideline Description

WP5 establishes the methodological framework for evaluating CSE initiatives using interdisciplinary approaches. It integrates Social Practice Theory (SPT) to analyze behavioral patterns, through a sociomaterial perspective that sees the social and material as entangles, and Life Cycle Assessment (LCA) to quantify environmental impacts. These guidelines ensure consistency in data collection in order to facilitate cross-country comparisons of sustainability outcomes (Markussen et al., 2024).

1.3.1 Social Practice Theory

SPT provides a lens for understanding how social, material, and cultural elements interact to shape sustainability practices. It examines how individuals engage with CSE initiatives through established norms, competencies, materials and shared meanings. By focusing on practices rather than individuals, SPT helps identify systemic barriers and enablers to long-term adoption of sustainability behaviors. This approach aligns with WP5's emphasis on

understanding social dynamics as a key factor in sustainable transitions (Markussen et al., 2024).

SPT, as conceptualized by Shove et al. (2012), examines the dynamic interplay between social practices and their constitutive elements - **materials, competence, and meanings**. SPT positions practices as the central unit of analysis, emphasizing how they are shaped by and, in turn, shape social and material contexts.

SPT is particularly relevant to the study of CSE initiatives, as it offers a lens to understand how these initiatives influence everyday social practices, including consumption, waste generation, and mobility choices. While initiatives within reuse and repair contribute to measurable environmental benefits, their broader impact may lie in the long-term shifts they induce in social practices. Employees, volunteers and visitors engaging with these spaces may adopt new habits and values that extend beyond the immediate activities, potentially leading to more profound environmental and behavioral changes over time.

A purely conservative environmental assessment, which focuses on direct material savings, may therefore overlook or even misrepresent the full scope of an initiative's impact. Drawing on Shove et al. (2012), who build on the work of Reckwitz (2002) and Schatzki (2012), we emphasize that practices are not individually driven but rather routinized and collectively sustained. From this perspective, CSE initiatives function as sites of social learning and norm formation, fostering the institutionalization of sustainable practices within communities.

A fundamental distinction within SPT is between **practice-as-performance** (observable enactments of practice) and **practice-as-entity** (the underlying structures, norms, and meanings that form the sustained practices over time). This distinction allows for the examination of both the immediate manifestations of social practices and their embeddedness in broader infrastructures and cultural conventions.

SPT also accounts for the circulation and transformation of practice elements. The interaction of materials (objects, infrastructures), competence (skills, know-how), and meanings (cultural conventions, shared understandings) determines whether a practice is established, evolves, or dissolves. Changes in CSE initiatives, for instance, may lead to the reconfiguration of these elements, influencing how sustainable practices emerge and persist.

Moreover, Shove et al. (2012) describe the interrelations between practices, which form bundles (loosely connected practices) and complexes (interdependent practices). Understanding these interconnections is essential for scaling up and institutionalizing sustainable practices within urban settings. As CSE initiatives evolve, their success depends not only on individual participation but also on their integration into broader socio-material networks.

By applying SPT, researchers can systematically analyze the stability, transformation, and diffusion of sustainability practices, offering critical insights into the mechanisms through which CSE initiatives influence social and environmental change.

1.3.2 Life Cycle Assessment

LCA is a quantitative tool used to assess the environmental footprint of products and services throughout their lifecycle (Bjørn, Owsianiak, et al., 2018).. Applied to CSE initiatives, it can help measure the baseline for carbon emissions, energy consumption, waste generation and other environmental indicators. The WP5 guidelines suggest an LCA methodology based on the ISO 14040/44 standards, ensuring standardized impact assessment across the different CSE initiatives (Markussen et al., 2024).

LCA is a decision-support tool that facilitates sustainability improvements by identifying opportunities to reduce resource consumption, minimize pollution, and enhance environmental efficiency (Bjørn, Laurent, et al., 2018). It can inform product design, supply chain management, and policy-making, ensuring that sustainability measures are grounded in comprehensive environmental impact assessments.

The Four Phases of LCA

1. **Goal and Scope Definition:** Establishes the purpose of the assessment, defines system boundaries, and determines the functional unit of analysis (Bjørn, Laurent, et al., 2018).

2. **Life Cycle Inventory (LCI):** Collects data on all inputs (materials, energy) and outputs (emissions, waste) for each life cycle stage, forming the basis for impact assessment.

3. **Life Cycle Impact Assessment (LCIA):** Evaluates environmental impact categories such as climate change, resource depletion, and ecosystem effects (Hauschild, 2005).

4. **Interpretation:** Analyzes findings to draw conclusions, compare scenarios, and provide recommendations for sustainability improvements (Hauschild et al., 2018).

Even though the significance of the LCA's could give a more precise picture of the environmental impacts of each initiative this baseline represents the initiatives data in its current form, making the environmental impact assessment of the initiatives differ in the use of the method. The exact approach to the environmental results is stated within the chapters for each initiative.

1.3.3 Baseline Assessment

This document provides a baseline assessment of four initiatives, each offering distinct approaches to sustainability and resource efficiency.

1. **Denmark – Repair Café Initiative**: A community-driven initiative where volunteers help repair household items to extend their lifespan and reduce waste. The assessment focuses on the role of social interactions, skill-sharing, and the environmental impact of avoided waste and product replacement.

2. **Norway – Reuse of Furniture in Asker Municipality**: A municipal initiative that facilitates the reuse of office furniture through a digital platform and physical storage. The study examines logistics, the role of digital tools in promoting reuse, and the environmental savings achieved through furniture repurposing.

3. **Latvia – Nomales Initiative**: A material-sharing platform that promotes circular use of resources by redistributing surplus materials. The assessment highlights the social and economic dynamics of material exchanges and their contribution to waste reduction.

4. **Poland – Jadłodzielnia (Food Sharing Initiative)**: A community-led food-sharing program that combats food waste by redistributing surplus food to those in need. Unfortunately, due to a prolonged process of obtaining ethics approval from the Human Research Ethics Committee of Adam Mickiewicz University the study of this initiative is first expected to start after the hand-in of this deliverable.

The following baseline assessment provides a structured evaluation of the three initiatives in Denmark, Norway and Poland offering insights into their environmental and social contributions while establishing a reference point for future comparisons. In Chapter 5, the Polish case is described from current knowledge, but lack the analysis based on the WP5 guidelines. This analysis is expected to start from late March 2025.

1.4 Methodology

The WP5 methodology employs an abductive approach, combining qualitative and quantitative data collection methods. It emphasizes participatory research techniques, stakeholder engagement, and empirical validation through real-world case studies (Markussen et al., 2024).

1.4.1 Interviews

In-depth or semi-structured interviews with key stakeholders will provide qualitative insights into their perspectives, experiences, and roles within the initiatives. A core set of guiding questions will ensure consistency while allowing for exploratory discussions.

1.4.2. Participant Observation

Observing daily activities, meetings, and events within the initiatives will provide an immersive understanding of practice-as-performance. Detailed field notes will capture interactions, behaviors, and operational dynamics, offering contextual insights into how participants engage with the initiatives.

1.4.3. Measurements of Product/Material Flows

Quantifying the flow of goods and materials within local hubs is crucial for assessing the environmental impact of the CSE initiatives. Accurate records should be maintained to support LCI assessments.

1.4.4. Data Collection for Life Cycle Inventory

To create an LCA, each party could systematically collect data on product and material use to create a baseline environmental impact assessment.

1.4.5 Additional Data Collection Methods

- **Participatory Workshops:** These workshops could engage stakeholders in discussions about the challenges and successes of CSE initiatives, generating collective insights and fostering knowledge exchange. This furthermore aligns with the objectives of WP2.

- **Surveys:** A quantitative survey can be conducted to gather demographic data, attitudes toward CSE initiatives, and self-reported resource-use behaviors.

1.4.6 Thematic Areas for Data Collection

The WP5 framework defines thematic categories for structuring data collection: Product/material flows, Operational data, Waste related data, Infrastructure and the facilities (buildings) for the infrastructure, Transportation, Social Practice Data (Markussen et al., 2024).

1.5 References

Bjørn, A., Laurent, A., Owsianiak, M., Olsen, S.I. (2018). Goal Definition. In: Hauschild, M., Rosenbaum, 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. Environmental 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., Rosenbaum, R., Olsen, S. (eds) Life Cycle Assessment. Springer, Cham. https://doi.org/10.1007/978-3-319-56475-3_12

Markussen, T., Dorland, J., & Jørgensen, M. S., (2024). D5.1 Methodological Guidelines for WP5: Environmental Impact Assessment. In TRANSSCALE, F-DUT-2022-0269. https://transscale.ba.lv/category/deliverables/

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

2. CSE Initiative in Denmark: Analyzing Repair Café Denmark

Authors: Tanja Markussen[1], Jens Dorland[1], Michael Søgaard Jørgensen[1], Julie Landboe-Christensen Hvid[1]

1) Department of Sustainability and Planning, Aalborg University, Copenhagen, Denmark

2.1 Presentation of Initiative

Repair Café Denmark are community-driven initiatives that provide free repair services facilitated by volunteers. These spaces serve as hubs for reducing waste and fostering a circular economy by encouraging reuse, repair, and skill-sharing among participants. Since 2006, the number of repair cafés in Denmark has grown from around 5 to around 130 early 2025, highlighting increasing public engagement with sustainable practices. The initiative supports individuals (visitors/bringers) in fixing everyday items, thereby reducing resource consumption and extending the lifecycle of consumer goods. Beyond repairing objects, these cafés function as spaces of social learning, promoting environmental awareness, and building communities.

For this study, we have chosen to investigate four repair cafés in the Capital Region of Denmark in the Copenhagen area: Repair Café Valby, Repair Café Sydhavn, Repair Café Frederiksberg and Repair Café Østerbro. The four cafés were chosen based on willingness and availability from both researchers and participants to communicate throughout.

2.2 Case Specific Methodology

This case study applies the general methodological framework outlined in Chapter 1.4 to assess the Danish Repair Cafés through qualitative and quantitative approaches, integrating Social Practice Theory and Life Cycle Assessment to capture both social and environmental dimensions.

2.2.1 Contextualization of Methods

The methodology was tailored to account for the characteristics of repair cafés, particularly their reliance on volunteers and community participation. Ethnographic techniques such as participatory observations and semi-structured interviews were employed to document real-time interactions, repair processes, and knowledge exchange. The study also integrated material flow assessments from Repair Café Denmark's own data collection, to quantify the environmental impact of repaired items and CO_2-emissions saved.

2.2.2 Selection and Implementation

To ensure a comprehensive analysis, multiple data collection methods were used:

- **31 semi-structured interviews** with 11 volunteers and 20 visitors/bringers to understand motivations, experiences and thereby social practices. The interviews were conducted within the period from 21/08/2024-12/09/2024.

- **On-site (participatory) observations** at all four repair cafés to capture repair practices in action.

- **A small survey with 10 respondents** assessed perceptions of sustainability and engagement from (10) volunteers not able to have a conversation on-site. The survey was sent out the 11/06/2024.

- **Material flow tracking**, measuring types of repaired items and frequency of repairs, based on Repair Café Denmark's own data collection methods from 2020 to 2024.

These methods balanced qualitative insights especially for analyzing the social practices with the quantitative data primarily used to create the environmental baseline assessment.

2.3 Case Activities/Flow

Repair cafés function as structured yet flexible initiatives, where visitors bring broken items, and volunteers assist in diagnosing and repairing them. The process follows a flow, ensuring that each visitor receives help from a skilled repairer while fostering an engaging, community-driven atmosphere.

The physical infrastructure supporting Repair Café Danmark plays a crucial role in the efficiency and accessibility of repair activities. Each repair café operates within a unique space, often housed in community centers or cultural houses, which influences the repair process, volunteer workflow, and visitor experience. The infrastructure includes aspects such as room size, storage facilities, accessibility, and the availability of essential tools and equipment.

One of the key factors shaping repair operations is the variability of facilities across different locations. Repair Café Valby, for example, operates from Valby Kulturhus. Repair Café Frederiksberg is located at Det Bæredygtige Forsamlingshus, a much smaller place (see picture 1). In Sydhavn, repairs take place at Karens Minde Kulturhus, the largest of the four places, while Østerbro's repair café operates out of Kildevæld Kulturcenter where they have to

change room from time to time. Each of these venues offers different spatial conditions, influencing how repairs are conducted and how visitors engage with the initiative.

Picture 1: Repair Café Frederiksberg.

Repair Café Frederiksberg is open every 3rd Thursday of the month from 16:30 to 19:00. Repair Café Sydhavn operates every 1st Thursday of the month from 17:00 to 20:00. Repair Café Østerbro is open every 3rd Wednesday of the month from 17:00 to 19:00. Repair Café Valby is open every 2nd Thursday of the month from 17:00 to 19:00.

The infrastructure of each repair café directly affects operational efficiency and the level of community engagement. Sufficient space allows for the accommodation of multiple repair stations, facilitating simultaneous repairs and minimizing waiting times for visitors. Proper storage facilities ensure that tools and materials remain in good condition and readily available for use, enabling volunteers to carry out a broad range of repairs effectively. As an example, Repair Café Valby operates in the FabLab of the culture center making the space suitable for repair not only in functional matter, but the floorplan makes the facility match perfectly with the expected vibe of the place (see on figure 1). Accessibility features, such as ramps and elevators, also play a role in ensuring that people with mobility challenges can participate, promoting inclusivity and expanding the reach of the initiative.
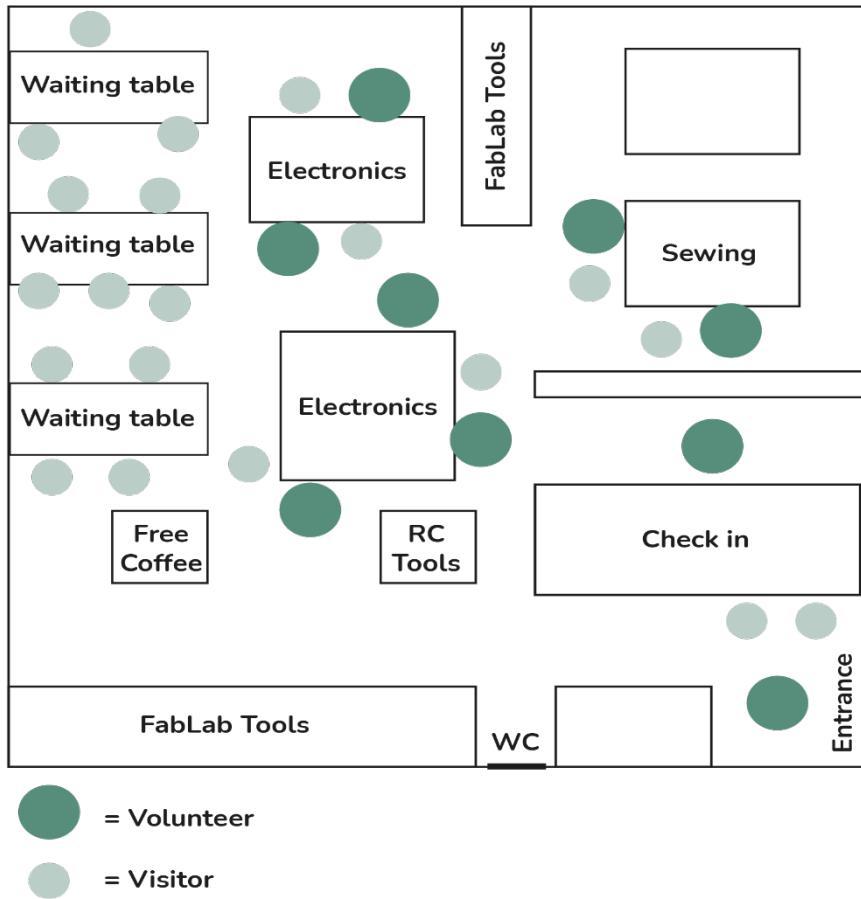
Figure 1: Floorplan of Repair Café Valby.

The choice of cultural and community centers as venues for repair cafés is strategic in fostering community engagement. These locations often function as social and cultural hubs, bringing together different groups of people for various activities. By situating repair cafés in such spaces, Repair Café Danmark benefits from increased visibility while also providing an informal learning environment where visitors can gain hands-on experience in maintaining and repairing their belongings.

Despite the benefits of operating within shared community spaces, certain challenges persist. Scheduling conflicts with other events hosted in these locations can sometimes limit the availability of space, (as experienced on Østerbro) while restrictions on customizing the setup to better suit repair activities may hinder efficiency. Additionally, limited storage space can make it difficult to maintain an organized inventory of tools and spare parts (each café has about one cabinet each). However, these challenges also open avenues for collaboration with venue administrators and local organizations. By working closely with community center management, repair cafés can secure dedicated repair time slots, negotiate shared storage arrangements, and even co-host events that promote sustainable practices (as seen in Valby).

The size, layout, and available facilities at these locations thus directly impact the number of repairs that can be performed simultaneously, the types of repairs possible, and the overall visitor experience. While some cafés have dedicated storage rooms for tools and materials, others work with minimal space, requiring creative solutions to optimize their workflow.

The collaboration between individual repair hubs and Repair Café Danmark as a central coordinating body is essential for ensuring consistency and operational efficiency across locations. While each café is locally managed and operates semi-independently, Repair Café Denmark provides overarching guidance, support, and networking opportunities. This collaboration ensures that best practices are shared, allowing repair hubs to learn from each other's experiences, optimize their logistical setup, and improve their service delivery.

One of the key benefits of this collaboration is resource allocation. Many repair cafés operate with limited budgets, and all rely heavily on volunteer-driven efforts. Repair Café Denmark helps coordinate funding opportunities, facilitate partnerships with municipalities or sponsors, and provide centralized access to tools and repair guidelines. For example, some hubs receive financial support from local committees to acquire necessary repair tools, while others may benefit from shared donations of materials. Without this involvement in structuring these connections, individual repair hubs might struggle to secure the necessary infrastructure to function effectively.

2.3.1 Sequential flow of initiative

Visitors arrive at the repair cafés using various transportation methods, depending on location and accessibility. Based on our empirical data visitors mostly arrive by bicycle or on foot and few with bus or by car, which highlights the local accessibility of the repair cafés, since most of the visitors cover relatively short distances, because the live in the neighborhoods (see figure 2). The data does show that a few visitors travel significant distances for repair, such as a 53 km car trip for a lawnmower repair at Frederiksberg, but this is uncommon according to our research.
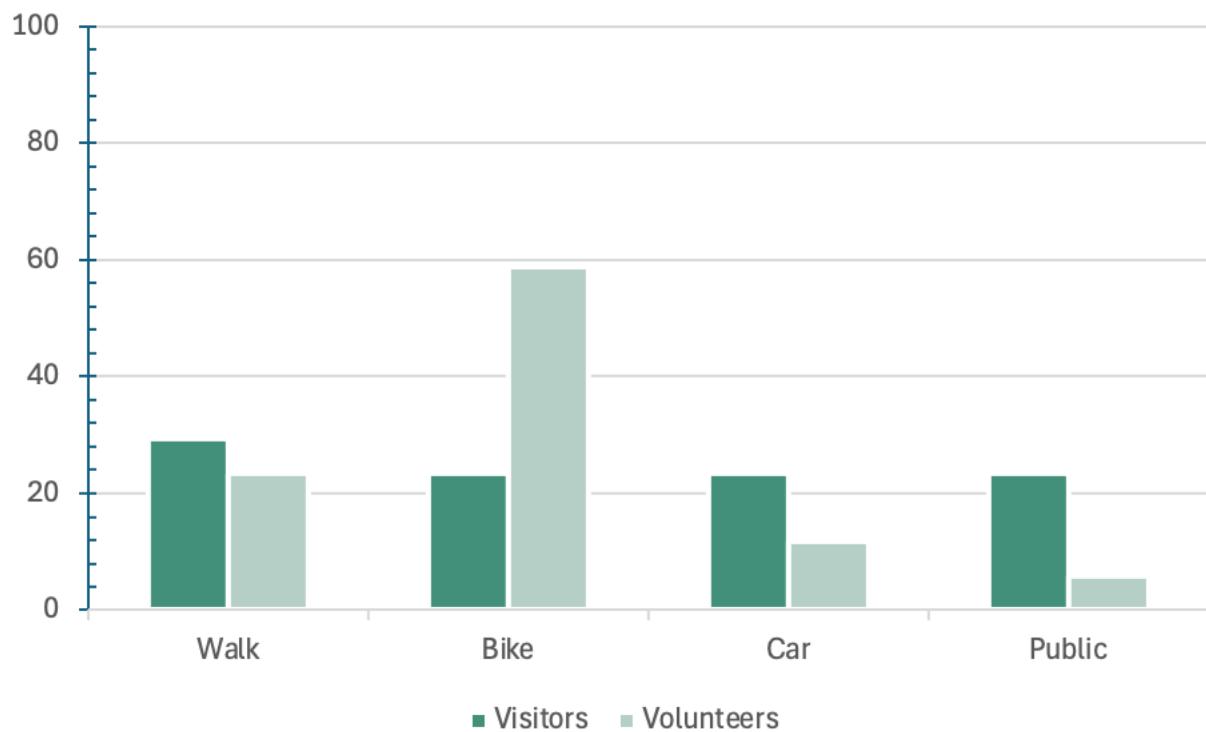
Figure 2: Visual representation of transportation choice of participants in % across the four repair cafés.

Upon arrival, visitors register with the coordinator, who welcomes them and collects information about the item they brought. The coordinator categorizes the product into one of the following repair categories: audio-visual equipment (e.g., speakers, radios, and so on), computers/tablets, household appliances, lamps, toys, mobile phones/smartphones, furniture, clothing, other textile tasks (e.g., alterations, mending), tools/gardening equipment, bicycles, or 'other items'. On figure 3 the product categories and total number of products brought to the four cafés in the period from 2020-2024 is shown.
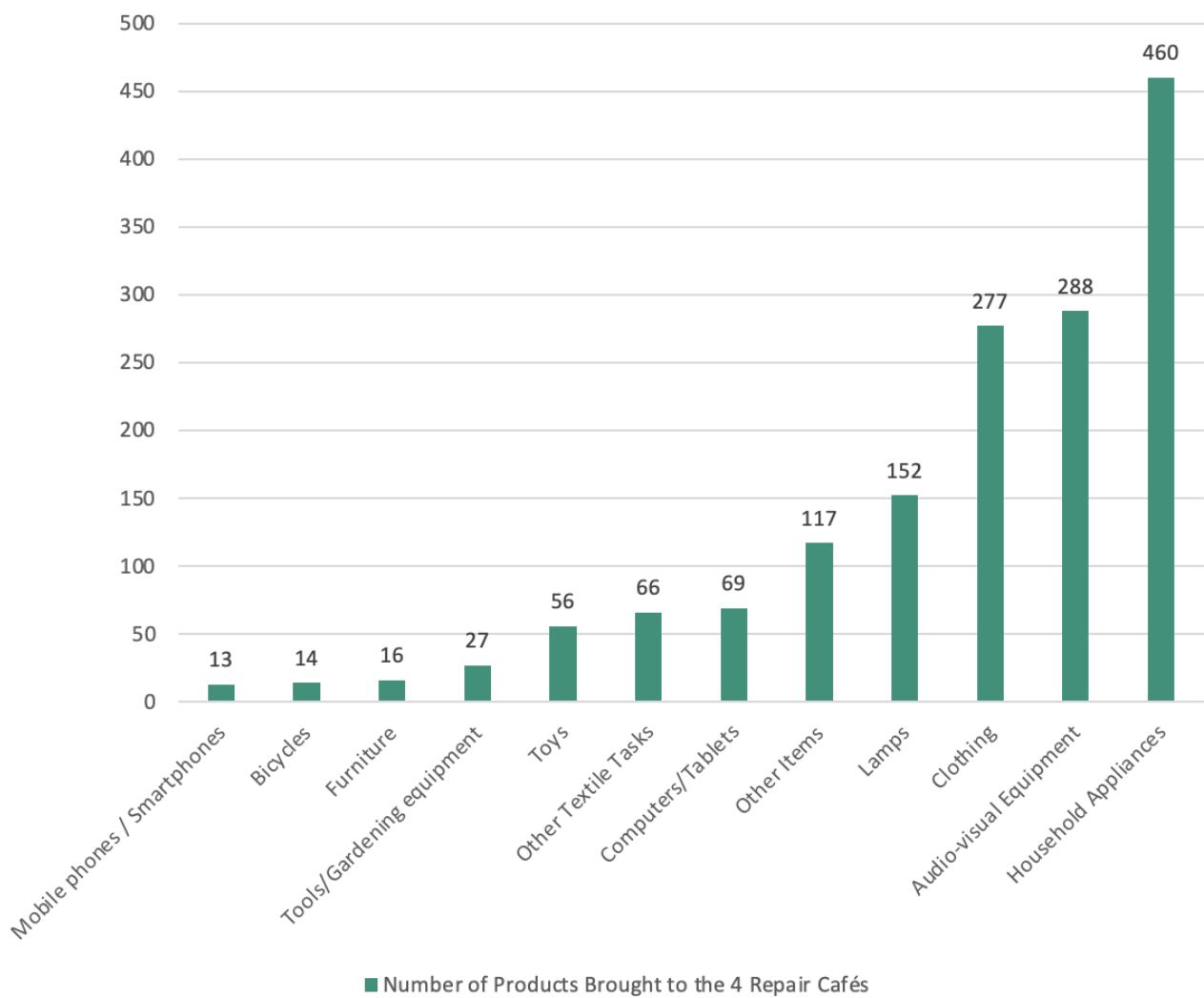
Figure 3: Number of products brought within each category in total between the four cafés.

Once categorized, the weight of the item is recorded by the coordinator, this is done by either using a simple kitchen scale for small objects (see picture 2) or through an estimated assessment by holding the item.

Picture 2: Scale used for estimating the weight of objects at Repair Café Frederiksberg.

It is hereafter the coordinators' role to document the data of the products brought in for repair in Repair Café Denmark's digital system (see picture 3). This data collection helps measure the impact of repair efforts by tracking the weight of fixed items.
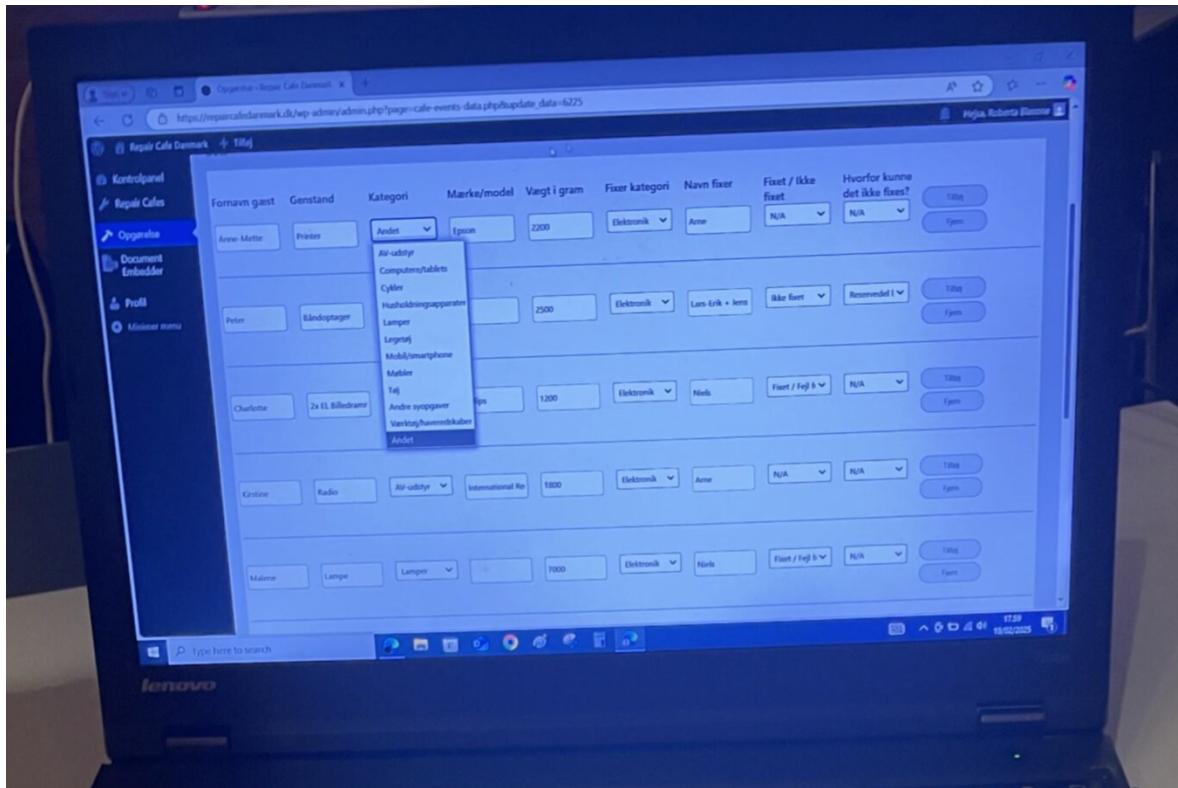
Picture 3: The digital datasheet for Repair Café Denmark's data collection.

After registration, visitors wait until a volunteer with the right competencies is available to assist them. It is the coordinators' role to keep track of which volunteer would be suitable to fix the products brought in. Volunteers are seated at tables dedicated to specific types of repairs, such as textiles, electronics, or mechanical items (see figure 4).
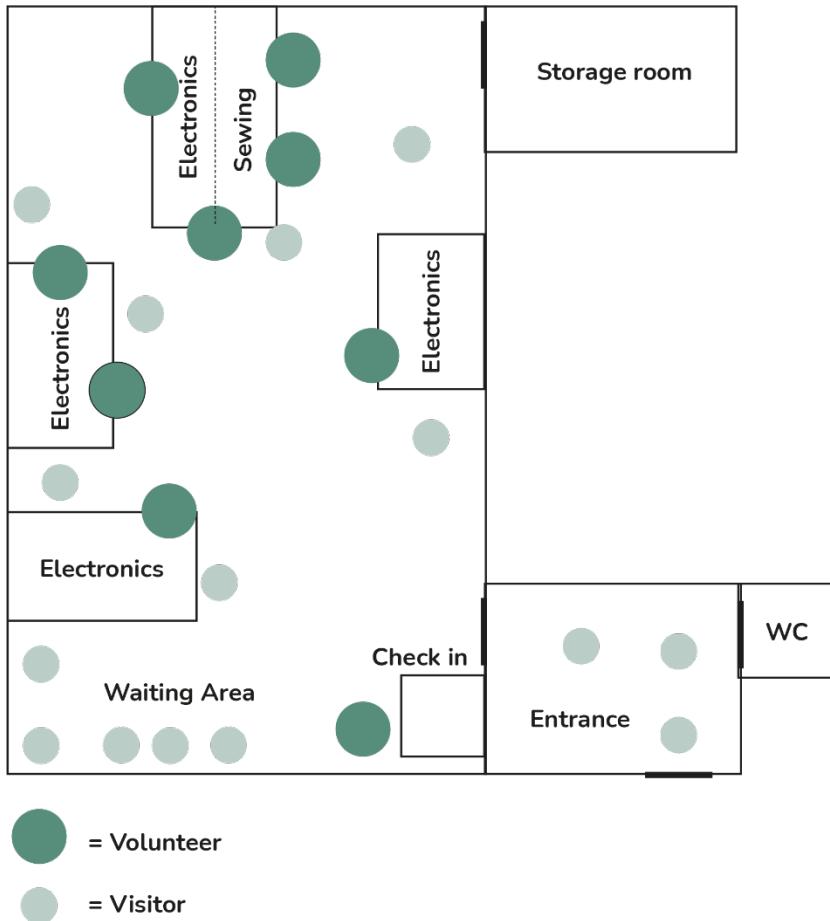
Figure 4: Floorplan of Repair Café Frederiksberg.

The repair process varies based on the complexity of the problem. Some repairs are quick and straightforward, while others require diagnostic troubleshooting or creative improvisation with spare parts. Occasionally, visitors actively participate to learn repair skills, while others prefer to observe. This is even though the manifest of Repair Café Denmark state that visitors are required to participate and learn. If an item is successfully repaired, the visitor thanks the volunteers and leaves with their fixed item. If the item cannot be repaired, volunteers explain the issue and, in some cases, suggest alternative solutions, such as reusing parts or seeking professional repair services. Due to the difficulties in estimating the time of repairs, it can happen that some visitors do not get assigned a volunteer and therefore must return home without assistance. Our observations showed that this mostly happens for visitors bringing electronics and more technical products. For example, a visitor in Frederiksberg came with a large flatscreen TV an hour after the opening of the café, this resulted in the coordinator estimating that, with the current queue, they would not have time to help him. Another example was in Østerbro where a mixer was so complicated to open (to fix) that the time of its repair hindered another visitor from receiving the help that they needed. The volunteers with competences to fix electronic and technical products, in general have the longest queues,

19

whereas volunteers with sewing competences have quicker tasks and therefore a shorter amount of people waiting in line.

Beyond the structured flow of repair, repair cafés foster a strong sense of community. Volunteers collaborate and share knowledge between each other, often working together to solve particularly complex issues. This means that if one volunteer encounters a problem, he or she will ask around the room to see if another volunteer's experience could be useful. In some cases, repairers take items home to continue working on them if the repair requires special tools or spare parts not available on-site. Meanwhile, visitors engage in conversations and learning, creating an interactive space where repair knowledge is shared across participants.

2.4 The Historical Trace of the Repair Café Practice

The emergence of repair cafés is closely intertwined with broader societal shifts towards sustainability, economic necessity, and changing consumption habits. The act of repairing is not merely a technical skill, but a deeply ingrained cultural practice passed down through generations, shaped by personal histories and broader social values. Many volunteers recall growing up in households where repairing was simply a way of life. A coordinator at Repair Café Frederiksberg explained how, in her childhood home, repairing things was a given, emphasizing that *"my father would never replace something unless it was completely beyond fixing. That mindset has stayed with me, and I now see it as my responsibility to pass it on"*.

Others similarly describe how their repair competence was influenced by family members. A repairman at Sydhavn shared that his grandfather, a resourceful and inventive man, lived by the principle that *"if you need something, create it"*. Carrying this philosophy into adulthood, he sees repairing not just as a skill but as a way of thinking that values resourcefulness over disposability. This transmission of values and skills across generations aligns with the notion that social practices persist when multiple elements are reinforcing eachother.

For some volunteers, repair has always been a fundamental part of life, deeply tied to sustainability concerns. A seamstress at Repair Café Sydhavn recalled how, even as a child, she was acutely aware of environmental issues and frustrated by wastefulness. Over time, she found that taking action through repair was more effective than engaging in debates, explaining that *"even as a child, I was aware of environmental problems. I remember feeling frustrated about how much we waste. Now, instead of debating, I just take action—I repair, I teach, and I try to show others that we don't have to keep buying new things"*.

In addition to childhood influences, professional backgrounds also shape volunteers' repair skills and motivations. Many repairers, such as engineers, artisans, or technicians, see repair

cafés as an extension of their expertise and a means to contribute to society. A retired IT consultant and repairman at Østerbro, who has been involved with repair cafés for years, described himself as a lifelong tinkerer, explaining that *"I've always been a tinkerer. I fix things because it makes people happy. But I also enjoy teaching others—I want them to see that they, too, can do it"*.

The values and skills that underpin repair cafés are not only individual but shared, reinforcing sustainability as a collective commitment rather than an isolated endeavor. A coordinator at Frederiksberg highlighted how these spaces facilitate the transfer of knowledge across generations, expressing a strong belief that; *"Repair cafés are more than just fixing things. It's about bringing people together across generations to share knowledge. I strongly believe that if younger people learn these skills now, they'll carry them forward, just like I did"*.

Thus, the historical trace of repair practices reflects a dual evolution: On one hand, a continuation of personal traditions and inherited values, and on the other, an adaptation to contemporary social and environmental concerns. Through this interplay of meaning and competence, the practice of repair is sustained, bridging past and future in a way that enables repair cafés to function as enablers for a more circular economy.

2.4.1 Types of Volunteers

The volunteers at the four repair cafés come from diverse professional and personal backgrounds, but they share a commitment to keeping objects in use and supporting their communities. Their roles and motivations can be classified into distinct types based on their skills, attitudes toward repair, and reasons for participating.

One prominent category is the **technical expert,** often with a background in engineering, electronics, or mechanics. These volunteers have extensive hands-on experience with repairing items and view the practice as both a skill and a challenge. A repairman at Sydhavn, who previously worked as an electronics engineer, described himself as a *"fixer type"* who is drawn to the technical aspect rather than the sustainability message, though he acknowledges it as a *"nice bonus."* Similarly, another volunteer at Østerbro, a former IT consultant, described his motivation as *"finding the problem and seeing people happy when their things are fixed"*, highlighting the satisfaction derived from problem-solving.

Another type is the **craft-based volunteer**, such as seamstresses and artisans, who focus on textile and aesthetic repairs. Many of these volunteers developed their skills informally, often outside their primary profession. A seamstress at Sydhavn, originally trained as a photographer, viewed sewing as a *"life skill"* she had cultivated over time. While she is

committed to sustainability, she sees her role primarily as a practical one, explaining that *"I'm happy to teach others, but sometimes I just want to focus on getting things done"*.

A third category includes the **community-oriented volunteer**, who sees repair cafés as a means of fostering social connections. These volunteers are drawn to the collective aspect of repair rather than the technical challenge alone. A coordinator at Frederiksberg, for instance, emphasized the importance of sharing knowledge across generations, explaining that *"Repair cafés are more than just fixing things. It's about bringing people together"*. Similarly, a volunteer at Østerbro, who regularly attends social gatherings with fellow repairers, highlighted the joy of *"the back-and-forth exchange of ideas - it's about solving problems together"*.

Finally, there are a few **activist volunteers**, who are deeply committed to countering overconsumption and the throwaway culture. These individuals often have strong environmental motivations and see repair cafés as part of a larger movement. A volunteer at Sydhavn described how she had always been passionate about sustainability, but that the repair café had *"shifted the focus to something more positive, where I can actively make a difference instead of just debating endlessly"*. For these volunteers, repair is not just about fixing items but about advocating for systemic change.

While volunteers may fall into these broad categories, many embody multiple motivations and skill sets. Some join primarily for social reasons but develop technical skills over time, while others begin with an environmental focus and later appreciate the technical problem-solving aspect. The diversity of volunteers ensures that repair cafés are not just spaces for fixing objects but also for learning, collaboration, and community building.

2.4.2 Types of Visitors/Bringers

Visitors at repair cafés, also referred to as "bringers," vary widely in their motivations, backgrounds, and approaches to repair. While some engage actively in the process, others come primarily seeking a service. Their participation can be categorized into several overlapping types based on their motivations and relationships with repair culture.

One common type is the **pragmatic bringer,** who seeks repair primarily for economic reasons. These individuals often express frustration with the cost of replacement and/or professional repair services. A visitor at Frederiksberg shared that she had always been used to taking care of her belongings out of financial necessity, explaining that *"I grew up knowing that if something broke, you fix it. Buying new was not an option"*. For her, sustainability was not a primary concern, but an incidental benefit. Similarly, another visitor at Sydhavn, who had a powered screwdriver repaired, remarked that *"it's ridiculous to throw things away just because they stop working. It makes no sense to spend money on a new one if this one can still do the job"*.

Another category consists of the ***sustainability-conscious bringers***, who view repair as part of a broader ethical commitment to reducing waste. A visitor at Frederiksberg, who brought in a broken lamp, described herself as someone who buys secondhand whenever possible, explaining that *"it's the only right thing to do for future generations and our shared planet"*. For these types of visitors, repair is not just about functionality but about taking a stand against overconsumption.

A third type is the ***sentimental bringer***, who values repair due to emotional attachment to specific objects or products. These visitors often bring items that hold personal or family significance. One visitor at Sydhavn brought in a 20-year-old sewing machine, not just for its functionality but because she was deeply attached to it *"I love this machine",* she explained *"It has been with me for years, and I want to keep using it rather than replace it with something new."* Similarly, another visitor at Frederiksberg, who brought a Sonos speaker, was interested in getting it repaired because it matched his existing collection, reinforcing how personal preferences and attachment influence participation.

Finally, there are the ***curious and learning-oriented bringers***, who see repair cafés as an opportunity to acquire new skills. These visitors do not simply want their items fixed, but they want to understand the process. A visitor at Østerbro, who needed his stand mixer repaired, was highly engaged in the repair process, noting that *"I want to see how it's done so I can fix it myself next time"*. This aligns with the idea of repair as a form of empowerment, transforming bringers into potential future fixers.

While these categories highlight different motivations, they are not mutually exclusive. Many visitors have overlapping reasons for seeking repairs, and their engagement with the repair process varies. Some actively participate, while others prefer to have the volunteers handle the repair for them. Regardless of their motivations, all bringers contribute to the ongoing practice of repair by sustaining demand for these community initiatives. This demand is reinforced by the visitors' lack of either knowledge, skill or will to repair themselves at home.

2.5 Practices of Initiative

Applying SPT, the repair practices at repair cafés involve three key elements as seen from a practice-as-entity perspective:

- **Materials** are central to the repair café ecosystem, providing both the basis for repair activities and shaping the techniques employed by volunteers. Tools that stem from working tools (e.g., different types of screwdrivers, pincers, glue and so on) to

competence-enhancing tools (e.g., Youtube-videos, manuals and such), spare parts, and infrastructure such as worktables and communal spaces form the backbone of repair operations. Additionally, the items brought in for repair influence the competencies required to fix them, as volunteers adapt their skills to address specific design and mechanical challenges which shape the repair process as a whole. These materials are not only instrumental in individual repair acts but also serve as shared resources that reinforce the long-term viability of repair practices within the cafés.

- **Competences**: Volunteers' technical skills in mechanics, electronics, and textiles are critical as these types of products are within the top 20 most dominant products brought in for repair (see figure 5). The repair cafés function as spaces for knowledge transfer, where competencies are developed and shared among volunteers and visitors. At the individual level, volunteers apply technical skills to diagnose and repair items, often improvising solutions based on available materials. The volunteers also obtain knowledge through the use of the more competence-enhancing materials either before entering the cafés or as part of the repair process. At the structural level, these competencies are accumulated and institutionalized through the repeated interactions between the volunteers and the products brought for repair, but also between the volunteers themselves, which forms a collective knowledge base that sustains repair practices over time. The ongoing exchange of skills, where experienced volunteers mentor the less experienced, ensures that repair knowledge is preserved and expanded, reinforcing the practice-as-entity of repair within the café ecosystem.
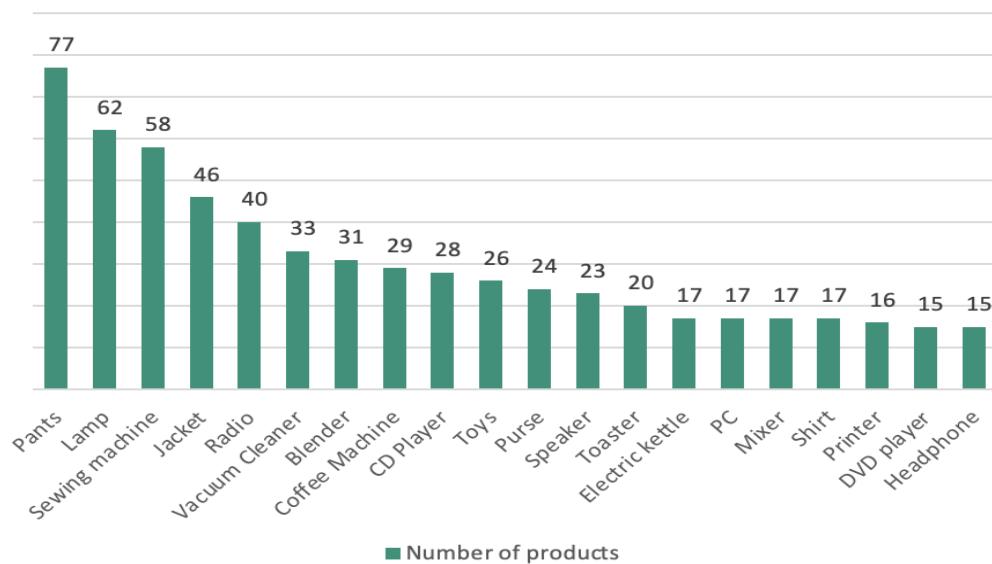
Figure 5: Top 20 most dominant products brought in for repair in the four repair cafés across all categories in 2020-2024.

- **Meanings**: Repair cafés embody cultural meanings of sustainability, craftsmanship, and community resilience. The repair process in cafés is not solely about fixing objects (although a vast majority of the volunteers see themselves as "fixers" that like to fiddle with products) but also about embedding broader cultural and environmental values. Participants often view repair as an act of resistance against the "throwaway culture," embracing it as a means to promote sustainability and resourcefulness. Additionally, the social aspect of repair cafés is fostering community engagement and cross-generational skill-sharing, which contributes to the broader social significance of the practice. These meanings become embedded in the structure of the cafés, influencing participants' attitudes toward consumption and can potentially encourage long-term behavioral change for the participants.

Together, these elements shape practice-as-entity within the repair cafés as a stable, recurring social practice that extends beyond individual actions (practice-as-performance).

2.5.1 Bundles of Practices within Repair Cafés

Repair cafés function as ecosystems of interconnected practices, where various types of repair merge and evolve through the interactions of volunteers and visitors. Rather than existing as isolated activities, repair types are bundled together, reinforcing and shaping one another within a shared repair culture. Through the continuous exchange of materials, competencies, and meanings, repair cafés sustain a dynamic social and technical environment that extends beyond the act of fixing broken objects.

The repair work carried out at repair cafés can be categorized into different types of repair, each fulfilling distinct purposes but frequently overlapping in reality:

- **Diagnostic Repair** – Identifying and troubleshooting technical problems, forming the foundation for all subsequent repairs.
- **Functional Repair** – Restoring everyday items to usability, the primary goal for many bringers.
- **Creative Repair** – Improvising with alternative materials or methods when original parts are unavailable, often leading to innovative solutions.
- **Sentimental Repair** – Fixing objects with emotional or historical value, where preservation outweighs efficiency.
- **Aesthetic Repair** – Restoring the visual appearance of an item, often in combination with functional or sentimental repair.
- **Educational Repair** – Teaching bringers repair skills so they can maintain their items in the future, empowering them to participate actively.

- **Social Repair** – Building social connections and relationships through shared activities, knowledge exchange, and collaboration around repair.

In practice, these repair types do not occur in isolation but blend together in response to the needs of visitors, the materials available, and the expertise of volunteers. This means that repair activities often overlap dynamically, leading to fluid interactions between repair types. Volunteers and visitors constantly adjust their approaches, demonstrating flexibility in problem-solving and knowledge-sharing.

For example, diagnostic repair frequently transitions into educational repair, as volunteers explain troubleshooting techniques while identifying faults. A visitor at Østerbro, who had brought in a stand mixer and a robot vacuum cleaner, actively engaged in the diagnostic process, noting that *"I want to see how it's done so I can fix it myself next time"* and a man from Sydhavn said *"I'm asking lots of questions because I don't want to rely on others forever. If I can fix my bike charger myself next time, even better"*. Rather than simply relying on volunteers, these visitors sought to acquire repair skills, illustrating how diagnostic repair acts as an entry point into competence-building and learning.

Similarly, creative repair often blends with functional and aesthetic repair, particularly in cases where bringers seek both practical and visual restoration. A seamstress at Sydhavn emphasized the importance of aesthetic repair in textile work, explaining that she enjoys *"making clothes pretty again",* but she also stated that she *"doesn't always have the energy for it, especially if the dynamic between me and the visitor isn't good"*. This statement highlights how social interaction influences repair outcomes, demonstrating how aesthetic and social repair are closely interwoven. Volunteers do not simply restore objects, but they navigate expectations, relationships, and communication, which ultimately affect the repair process.

Sentimental repair can also overlap with educational repair, as volunteers take extra time to teach visitors how to preserve emotionally valuable items. A visitor at Sydhavn, who brought in a 20-year-old sewing machine, described her emotional connection to the object. The volunteers, recognizing the value embedded in such objects, often engage in more detailed explanations to ensure visitors can continue caring for these items themselves. In this way, sentimental and educational repair reinforce each other, ensuring that repair knowledge is passed down alongside material preservation.

A visitor at Frederiksberg, who sought repair for her remote control, illustrated how economic motivations intertwine with social repair and she engaged in a lively discussion with volunteers while they tested different components, sharing stories about how she had always tried to fix things rather than replace them (for economic reasons). This type of statement highlights how repair is sustained not just by necessity but by deeply ingrained cultural values, demonstrating

how the meanings attached to repair evolve over time. She later remarked, *"I don't care much about sustainability, but I love chatting with the people here"*. In these cases, diagnostic repair acted as a gateway to social interaction, turning problem-solving moments into shared experiences that strengthened community bonds.

At a broader level, social repair underpins all other forms of repair, as the café's environment fosters a culture of collective problem-solving. Volunteers frequently emphasize the importance of sharing knowledge and creating an inclusive repair space, which demonstrates how repair is not simply a technical process but a socially embedded practice, where skills, values, and relationships are continuously reshaped through interaction. Rather than operating as static service hubs, repair cafés function as living ecosystems where practices adapt based on available materials, competencies, and meanings. Volunteers and visitors continuously exchange skills, problem-solving techniques, and sustainability values, shaping an evolving culture of repair. Through these bundled repair practices, repair cafés serve as incubators of sustainable habits, where skills and values are continuously transmitted across individuals and generations. By reinforcing the interconnected nature of repair, these spaces challenge the throwaway culture and promote circular economy principles at the community level.

2.6 Environmental Assessment of Initiative

The environmental impact of the four repair cafés is primarily assessed through the CO_2 savings generated by repairing products instead of discarding them. Every item repaired contributes to reducing waste, lowering demand for new product manufacturing, and extending the lifecycle of consumer goods. Each of the repair cafés (i.e., Frederiksberg, Sydhavn, Østerbro, and Valby) has recorded significant CO_2 savings across the different product categories, reflecting the scope and impact of the initiative. These calculations are based on estimated emissions associated with the production, transportation, and disposal of goods, which are avoided when an item is repaired rather than replaced. The calculation of CO_2 savings is based on Life Cycle Assessment methodologies, which evaluate the environmental impacts associated with all stages of a product's life - from raw material extraction through production, distribution, use, and disposal. These calculations consider the emissions generated during the manufacturing and transport of products and compare them with the emissions avoided when an item is repaired rather than replaced (Lindeburg, 2022).

Aalborg University, in collaboration with Repair Café Danmark, has conducted detailed analyses of different product types to determine their CO_2 emissions associated with production and distribution (Lindeburg, 2022). These analyses take into account a range of material and energy factors, such as the amount of copper wire in a vacuum cleaner motor and the CO_2 emissions of transportation by different types of vehicles. The assessment is based on

data from SimaPro, which contains extensive information on various materials and their recyclability. For example, the study found that a kitchen appliance has an emission factor of 2.59 kg CO_2/kg, while a flat-screen TV has a significantly higher emission factor of 36.35 kg CO_2/kg (Lindeburg, 2022). These factors account for the emissions generated during production and transportation, minus potential savings from material recycling. Repair Café Denmark have adopted these findings as a basis for calculating the environmental benefits of their work, making it possible to quantify the CO_2 savings achieved through repairs.

At Repair Café Frederiksberg, the total estimated CO_2 savings amount to 3093 kg, with household appliances contributing the highest share at 1029 kg CO_2 saved since 2023 (see table 1). Other significant categories include clothing (417 kg CO_2), AV equipment (811 kg CO_2), and computers/tablets (407 kg CO_2). The total number of products repaired at this location is approximately 213 items, with a combined weight of 440,145 kg (see figure 6). This café has seen a consistent demand for electronic repairs, as visitors often bring audio-visual equipment and kitchen devices, reflecting a broader shift toward repairing rather than replacing expensive gadgets.

Kategori	2025	2024	2023	Total
AV-udstyr	132 kg CO_2	364 kg CO_2	315 kg CO_2	811 kg CO_2
Andet	7 kg CO_2	102 kg CO_2	13 kg CO_2	121 kg CO_2
Andre syopgaver	22 kg CO_2	18 kg CO_2	5 kg CO_2	45 kg CO_2
Computere/tablets	65 kg CO_2	284 kg CO_2	58 kg CO_2	407 kg CO_2
Cykler			1 kg CO_2	1 kg CO_2
Husholdningsapparater	38 kg CO_2	580 kg CO_2	411 kg CO_2	1.029 kg CO_2
Lamper	24 kg CO_2	107 kg CO_2	21 kg CO_2	152 kg CO_2
Legetøj		9 kg CO_2		9 kg CO_2
Mobil/smartphone			25 kg CO_2	25 kg CO_2
Møbler	7 kg CO_2			7 kg CO_2
Tøj	41 kg CO_2	271 kg CO_2	105 kg CO_2	417 kg CO_2
Værktøj/haveredskaber		21 kg CO_2	49 kg CO_2	70 kg CO_2

Table 1: Annual CO2-emissions saved at Repair Café Frederiksberg.
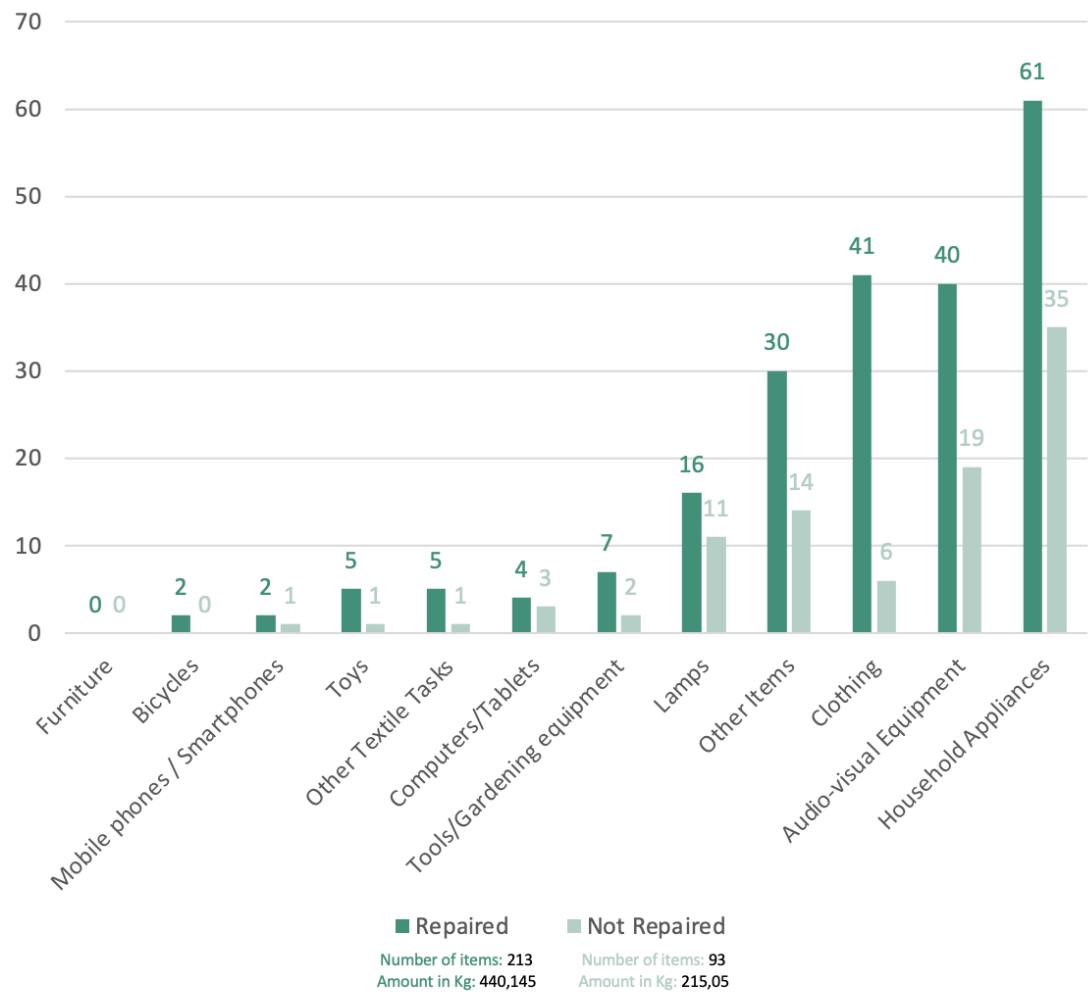
Figure 6: Number of registered items at Repair Café Frederiksberg (2023-2024).

At Repair Café Sydhavn, the initiative has achieved total CO_2 savings of 2144 kg since 2022. Among the highest-contributing categories, household appliances have saved 730 kg CO_2, AV equipment 510 kg CO_2, and Computers/tablets 291 kg CO_2 (see table 2). The range of repaired items in this café showcases the diversity of repair practices, even though it is also household appliances that take the lead. The café has repaired approximately 144 items, with an estimated combined weight of 300,165 kg (see figure 7).

Kategori	2024	2023	2022	Total
AV-udstyr	123 kg CO_2	255 kg CO_2	131 kg CO_2	510 kg CO_2
Andet	1 kg CO_2	8 kg CO_2		9 kg CO_2
Andre syopgaver	25 kg CO_2	39 kg CO_2		64 kg CO_2
Computere/tablets	98 kg CO_2	65 kg CO_2	127 kg CO_2	291 kg CO_2
Cykler	6 kg CO_2	99 kg CO_2	33 kg CO_2	138 kg CO_2
Husholdningsapparater	266 kg CO_2	196 kg CO_2	268 kg CO_2	730 kg CO_2
Lamper	34 kg CO_2	11 kg CO_2	12 kg CO_2	57 kg CO_2
Legetøj	3 kg CO_2	14 kg CO_2	3 kg CO_2	19 kg CO_2
Mobil/smartphone	5 kg CO_2			5 kg CO_2
Møbler		5 kg CO_2		5 kg CO_2
Tøj	142 kg CO_2	117 kg CO_2	23 kg CO_2	282 kg CO_2
Værktøj/haveredskaber	14 kg CO_2	20 kg CO_2		34 kg CO_2

Table 2: Annual CO2-emissions saved at Repair Café Sydhavn.
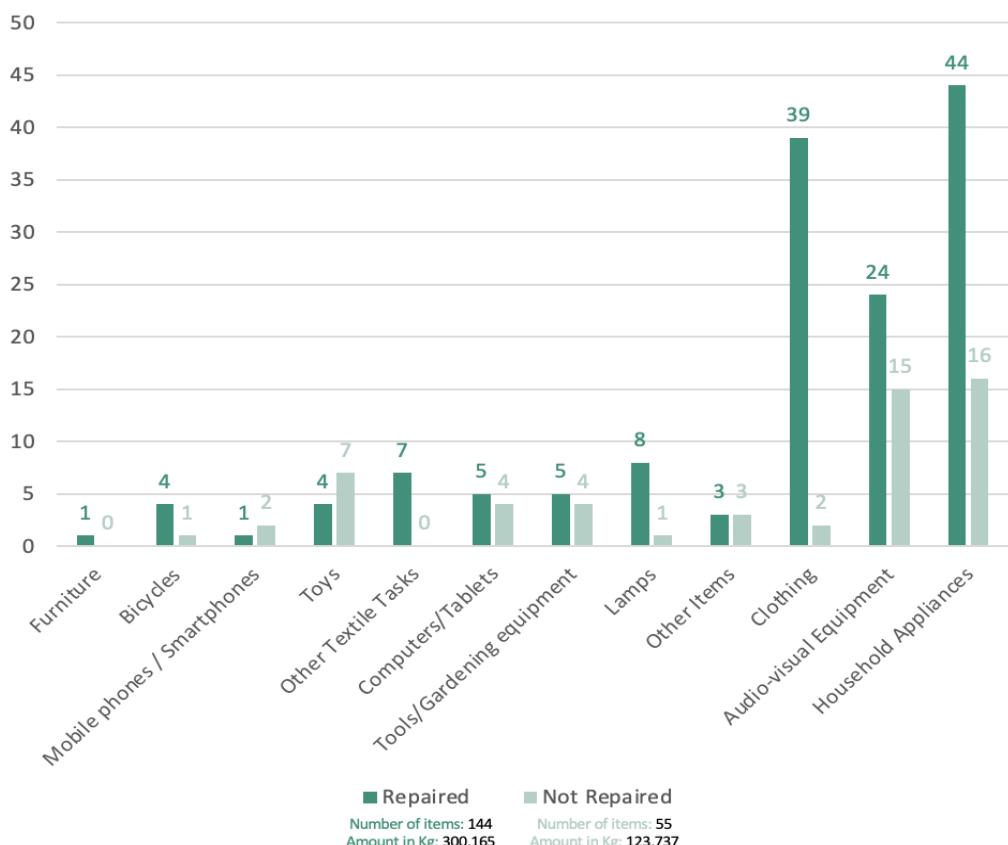
Figure 7: Number of registered items at Repair Café Sydhavn (2020-2024).

At Repair Café Østerbro, the total saved amount is 2692 kg CO_2. The most impactful categories at this café include household appliances (702 kg CO_2), computers/tablets (594 kg CO_2), and clothing (586 kg CO_2) (see table 3). The total number of repaired products stands at 180 items, with an estimated weight of 268,85 kg (see figure 8). Repairing clothing and textiles has been particularly effective in reducing CO_2 emissions, as textile production is one of the largest contributors to global carbon emissions. The high number of textile repairs at Østerbro could indicate a growing awareness of more sustainable fashion practices.

Kategori	2025	2024	2023	2022	Total
AV-udstyr	18 kg CO_2	204 kg CO_2	98 kg CO_2		319 kg CO_2
Andet		12 kg CO_2	26 kg CO_2	2 kg CO_2	39 kg CO_2
Andre syopgaver		45 kg CO_2	87 kg CO_2	24 kg CO_2	156 kg CO_2
Computere/tablets		539 kg CO_2	55 kg CO_2		594 kg CO_2
Husholdningsapparater	23 kg CO_2	355 kg CO_2	119 kg CO_2	206 kg CO_2	702 kg CO_2
Lamper		34 kg CO_2	46 kg CO_2	34 kg CO_2	113 kg CO_2
Legetøj		1 kg CO_2	3 kg CO_2	13 kg CO_2	17 kg CO_2
Mobil/smartphone	5 kg CO_2	124 kg CO_2	4 kg CO_2		133 kg CO_2
Møbler	5 kg CO_2	12 kg CO_2	0 kg CO_2		17 kg CO_2
Tøj	10 kg CO_2	204 kg CO_2	175 kg CO_2	197 kg CO_2	586 kg CO_2
Værktøj/haveredskaber		16 kg CO_2			16 kg CO_2

Table 3: Annual CO2-emissions saved at Repair Café Østerbro.
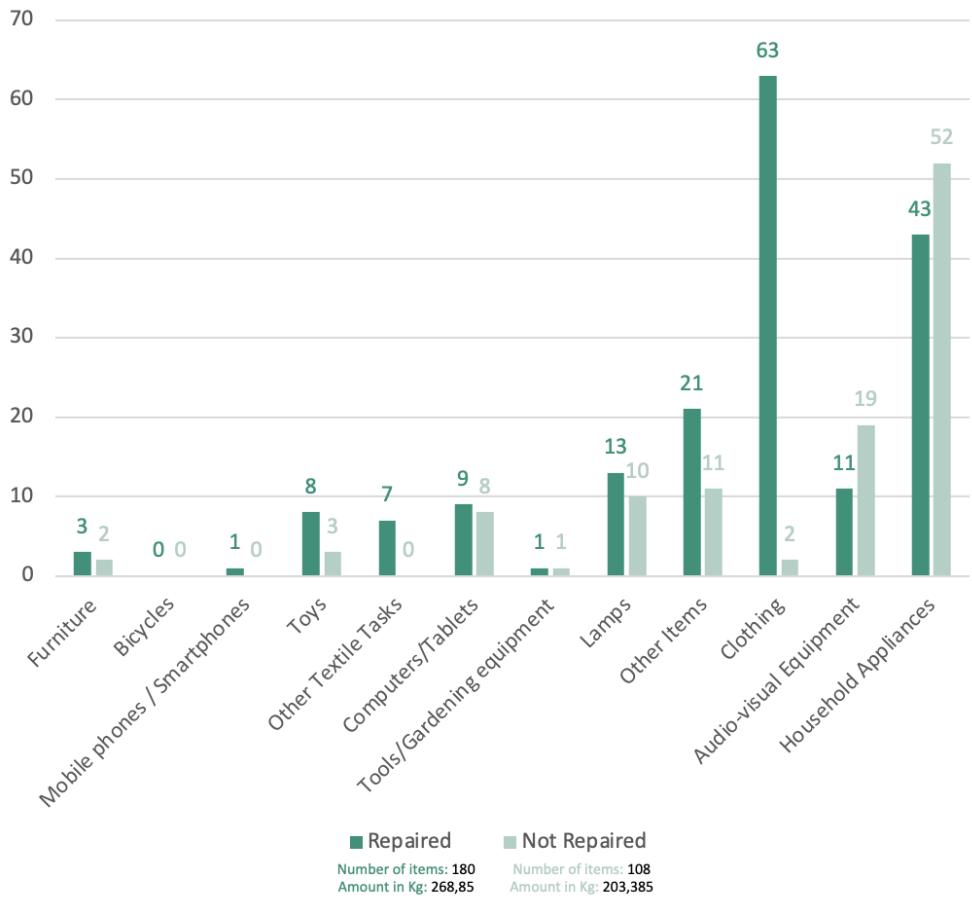
Figure 8: Number of registered items at Repair Café Østerbro (2022-2024).

At Repair Café Valby, the total CO_2 savings amount to 6862 kg, since 2020 (the year 1970 is used when volunteers forget to include a date when collecting the data, hence the data not being from 1970 but from somewhere between 2020-2024) with computers/tablets accounting for 2103 kg CO_2 saved, AV equipment for 1923 kg CO_2, and household appliances for 1484 kg CO_2 (see table 4). These numbers are significantly higher than the other cafés, which could be due to the fact that this café functions with an employed environmental consultant, who is responsible for not only attracting visitors, but also volunteers. The location of the café is furthermore significantly larger than the other three. The café has repaired approximately 499 items, with a combined weight of 737,075 kg (See figure 9). Given that this café repairs a large amount of clothing, audio-visual equipment and household appliances, its impact is particularly relevant in reducing waste in categories with low recycling rates and high resource extraction costs.

Kategori	2024	2023	2022	2021	2020	1970	Total
AV-udstyr	557 kg CO_2	449 kg CO_2	542 kg CO_2	366 kg CO_2	9 kg CO_2		1.923 kg CO_2
Andet	5 kg CO_2	32 kg CO_2	4 kg CO_2				41 kg CO_2
Andre syopgaver	85 kg CO_2	92 kg CO_2	5 kg CO_2			14 kg CO_2	196 kg CO_2
Computere/tablets	614 kg CO_2	1.023 kg CO_2	400 kg CO_2		65 kg CO_2		2.103 kg CO_2
Cykler	4 kg CO_2	62 kg CO_2	9 kg CO_2		25 kg CO_2		100 kg CO_2
Husholdningsapparater	357 kg CO_2	442 kg CO_2	537 kg CO_2	94 kg CO_2	53 kg CO_2		1.484 kg CO_2
Lamper	26 kg CO_2	61 kg CO_2	43 kg CO_2	49 kg CO_2			178 kg CO_2
Legetøj	14 kg CO_2	18 kg CO_2	19 kg CO_2				51 kg CO_2
Mobil/smartphone		36 kg CO_2					36 kg CO_2
Møbler	1 kg CO_2	19 kg CO_2	5 kg CO_2				25 kg CO_2
Tøj	150 kg CO_2	212 kg CO_2	180 kg CO_2	78 kg CO_2	25 kg CO_2		646 kg CO_2
Værktøj/haveredskaber		37 kg CO_2	18 kg CO_2	23 kg CO_2			79 kg CO_2

Table 4: Annual CO2-emissions saved at Repair Café Valby.
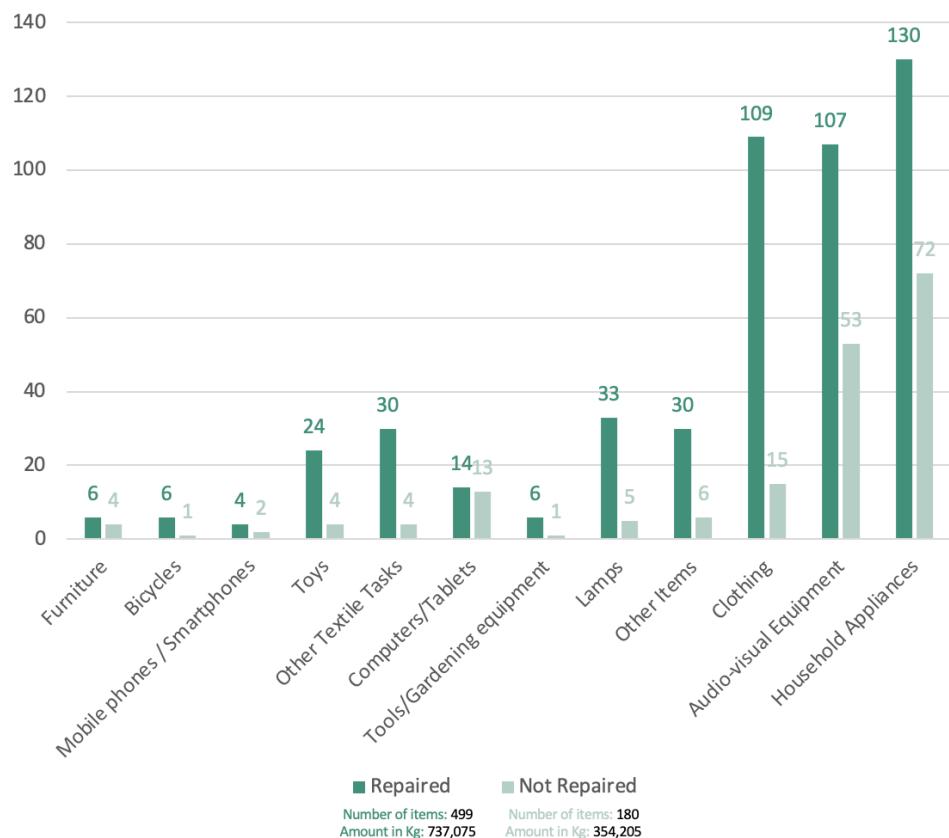
Figure 9: Number of registered items at Repair Café Valby (2020-2024).

33

Across all four repair cafés, the cumulative CO_2 savings reach an estimated 14.791 kg, since 2020 preventing thousands of kilograms of emissions from being released into the atmosphere. The repaired items collectively weigh approximately 1746,235 kg, demonstrating the tangible material impact of repair over disposal. Figure 10 show the total amount of reparations from 2020-2024. These figures highlight the crucial role of repair initiatives in reducing emissions, particularly in high-impact categories such as electronics, household appliances, and textiles, where resource-intensive production makes waste reduction even more significant.
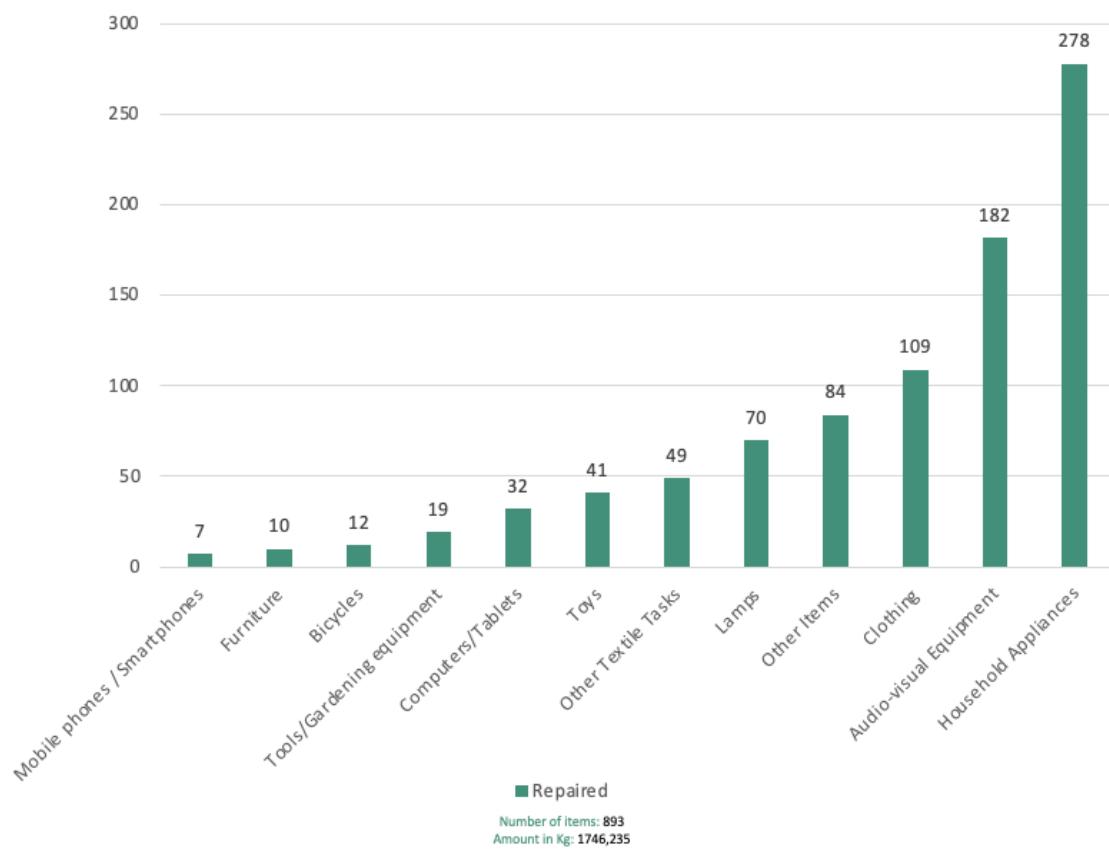
Figure 10: Total amount of repairs since 2020 in the four repair cafés.

Repair Café Danmark has also acknowledged the inherent uncertainties in their CO_2 calculations, particularly given the differences in LCA methodologies and variations in product data. Arne Skov, chairman of Repair Café Danmark, has outlined some of these considerations in a comprehensive review on their website (Repair Cafe Danmark, n.d.), where he discusses the challenges of standardizing LCA factors for diverse product groups. One major challenge is the variation in emissions factors between products of the same category. For example, the emissions associated with a repaired vacuum cleaner can differ significantly depending on its design, material composition, and manufacturing origin. While some models may have

components sourced from regions with a high reliance on fossil fuels, others may be produced in areas with a larger share of renewable energy in their grids, affecting their initial carbon footprint.

Furthermore, the durability and lifespan extension of repaired products add another layer of complexity to the calculations. While a repair prevents immediate replacement and reduces waste, its long-term impact depends on how much longer the item remains in use before ultimately being discarded. Repair Café Danmark recognizes that this aspect is difficult for them to quantify, as consumer behavior, product maintenance, and future repairability all influence the true environmental benefit.

Additionally, comparisons with international repair initiatives, such as The Restart Project in the UK, have provided Repair Café Denmark with insights into how impact measurement can be refined over time. The Restart Project has developed its own methodology for calculating CO_2 savings, focusing on avoided emissions through repair (Pickstone, 2021). By engaging in knowledge-sharing with such initiatives, Repair Café Danmark can assess different approaches to data collection and LCA integration. For instance, some models incorporate user surveys to estimate product lifespans more accurately, while others factor in repair difficulty levels and associated resource consumption.

These considerations highlight the evolving nature of CO_2 impact assessment in the repair sector. Arne Skov due discuss how the goal of their calculations is not to provide exact measurements of the CO_2 savings, but rather to make an estimate available to showcase enhancements and to give visitors and volunteers an extra motivator for doing as many repairs as possible.

2.7 Concluding remarks

The analysis of Repair Café Denmark as a CSE initiative highlights the role of community-driven repair practices in promoting sustainability and reducing environmental impact. Through the integration of SPT and LCA this study has demonstrated how repair cafés function as hubs for sustainability, skill-sharing, and community engagement while simultaneously reducing carbon emissions and material waste.

From a social practice perspective, the findings indicate that repair cafés foster a dynamic interplay between materials, competencies, and meanings. The volunteers and visitors who participate in these initiatives contribute to a broader culture of repair, challenging throwaway consumption patterns and reinforcing sustainable behaviors within the cafés. The various types of volunteers (ranging from technical experts to socially motivated individuals) illustrate how diverse skill sets and motivations converge to create an ecosystem of repair. Similarly,

visitors bring objects for repair due to financial, environmental, or sentimental reasons, further reinforcing the value of extending product lifespans.

The environmental impact assessment confirms that repair activities yield measurable benefits in terms of CO_2 savings. By avoiding premature disposal and reducing the demand for new product manufacturing, the repair cafés studied in this report collectively saved an estimated 14,791 kg of CO_2 emissions from 2020 to 2024. The most frequently repaired items (i.e., household appliances, electronics, textiles, and audio-visual equipment) represent product categories with high environmental footprints, making their repair particularly impactful. While these CO_2 savings estimates are subject to variations in measurements of weight and product lifespans, they provide a tangible indication of the environmental benefits of repair culture.

Despite their success, Repair Café Denmark face structural challenges, including limited storage space, inconsistent venue availability, and the need for continuous volunteer engagement. Addressing these challenges through stronger institutional support, partnerships with policymakers, and expanded public awareness campaigns could potentially enhance their scalability and long-term sustainability. Furthermore, strengthening data collection methodologies could improve the accuracy of environmental impact assessments.

In conclusion, the findings of this study underscore the importance of repair cafés as circular economy enablers. These initiatives not only reduce waste and carbon emissions but also cultivate a culture of sustainability that empowers individuals and communities. To maximize their potential, continued investment in repair infrastructures, public policy support, and greater collaboration between repair networks would be essential in scaling up their impact. Repair cafés exemplify how grassroots sustainability initiatives can serve as meaningful interventions in the transition toward more circular consumption patterns in Denmark, demonstrating that repair is not merely a technical act but a social movement toward environmental responsibility.

2.8 References

Lindeburg, A. (2022). *Miljøberegner - Repair Cafe Danmark*. Aalborg University Copenhagen.

Pickstone, J. (2021, October 27). *How do we measure the environmental impact of events?* The Restarters Community. https://talk.restarters.net/t/how-do-we-measure-the-environmental-impact-of-events/6077

Repair Cafe Danmark. (n.d.). *Beregning af klimaeffekt – Repair Cafe Danmark*. Retrieved March 3, 2025, from https://repaircafedanmark.dk/beregning-af-klimaeffekt/

3. CSE Initiative in Norway: Reusing Furniture Initiative in Asker Municipality

Authors: Lina Ingeborgrud[2], Katarina Hodal[2]

2) Nordic Institute for Studies of innovation, research and education, Oslo, Norway

3.1 Presentation of Initiative

Reuse of Furniture is an initiative developed in Asker municipality in Norway to increase the reuse of furniture and various inventory internally within the municipality. The main elements of this initiative consists of a physical warehouse where furniture is stored, a newly developed digital platform to organize and keep track of inventory and a person employed as - Norway's first and only - full-time furniture manager to organize the initiative. This person was hired in autumn 2022, as Asker municipality aimed to work with such initiatives in its daily operations.

In June 2024, Asker municipality signed an agreement with Loopfront – a company which works with digital tools for the reuse of building materials and inventory, to further develop the municipality's digital reuse platform, which has been in use since 2020.

The new platform from Loopfront will make it easy to reuse furniture, fixtures and ICT equipment internally for all employees in Asker municipality. In this platform, it is possible to keep track on savings of CO_2 emissions, money and amount of waste. The municipality started work on the platform in early autumn 2024 and the platform was completed and ready for use in December 2024. In this agreement, there are as many as 14 follow-on municipalities from the former Viken County. That is, they are interested in buying and using the platform when it is ready.

Thus, in this initiative, they have thought very specifically about scaling, but an important question is how this should be organized in the various municipalities, and not least success factors and obstacles for the various municipalities. With Reuse of Furniture as our Norwegian case in WP5, we aim to contribute with insights on these issues. Asker municipality can benefit from documentation in the TransScale project on how the reuse platform is used and how it might contribute to scaling of furniture reuse.

3.1.1 The Historical Trace of the Reuse of Furniture Initiative

The Reuse of Furniture initiative builds on previous work and experiences on reuse of office furniture in the municipality. Among others, a project completed in 2021, which looked at how much office furniture the municipality threw away daily and weekly at the recycling stations. The project was conducted in the context of a municipal merger of the "New Asker" municipality, where 600 employees were affected, moving to new locations. The project resulted in NOK 16 million (about 1,4 mill euros) saved and 90 tonnes of waste saved. It served as an important reference project for the decision to put reuse of furniture into daily operations in the municipality.

3.2 Case Specific Methodology

This case study applies the general methodological framework outlined in Chapter 1.4. It assesses the Reuse of Furniture initiative through qualitative and quantitative approaches, integrating Social Practice Theory and Life Cycle Assessment.

3.2.1 Contextualization of Methods:

The methodology was tailored to account for the characteristics of the Reuse of Furniture initiative, the available data, and not least, taking into account the present stage of the initiative. Initially, we had selected a different case for these assessments (OmIgjen shopping mall in Asker municipality), and we operationalized the questions as set out in the document *D5.1 Methodological Guidelines for WP5. Environmental Impact Assessment.*

We have adjusted the questions in line with the new case in collaboration with Asker municipality. For example, we had to leave out the initially planned questions with customers: for the new case, all users are employees in Asker municipality and few people have actually started to use the reuse platform. As such, there are fewer types of practitioners in the new case compared to the OmIgjen case. Also, the furniture initiative does not have data on the quantities and types of waste generated, nor on transportation modes used and distances for deliveries.

3.2.2 Selection and Implementation

We have used a combination of quantitative and qualitative data. The quantitative data was primarily used to create the environmental baseline assessment, and consists of material flow retrieved from the reuse platform Loopfront from two periods:

- from January 1th to January 23rd 2025
- from January 23rd 2024 to January 23rd 2025.

The qualitative data consists of one in-depth interview (1 hour) on January 9th with the furniture manager, online meetings and email exchanges with this manager as well as our collaborators in TransScale from Asker (sustainability advisors in the municipality). As stated, there are few people with experience of using the new reuse platform for the baseline assessment in January 2025 (as new platform was released December 2024), and we expect to conduct more interviews for the mid-term assessment.

3.3 Case Activities/Flow

The Reuse of Furniture initiative is a way for municipal employees in Asker to reuse office furniture. The efforts are coordinated through a digital platform. The furniture has, since 2019, been stored in the municipality's furniture warehouse (600 sqm), located a few minutes by car from the center of Asker. Here, all the municipality's businesses can deliver and pick up used office furniture. This warehouse was previously used as workshop and warehouse for the company Asker Produkt, which is a private work center that offers work training for people with disabilities. The warehouse is owned by Asker Pension fund and is open one to two days a week, advertised on internal social media. It is possible to meet by appointment as well. Transport of furniture is organized by the municipal enterprises or by the furniture manager ordering transport for example from NAV Modus, which is work training for young people. Many of the municipal enterprises have their own caretakers with trailers, and many pick up/deliver themselves – as they often do not have budget for freight. There is no data on how far the products travel on average. Asker is a long municipality, and the products are transported from the warehouse throughout the entire municipality, but most of them stay close to Asker city centre.

Transportation of furniture to recycling stations is organized by the municipal enterprises or furniture manager (ordered from either NAV Modus or Property Department Service Group). On the question on how furniture waste is handled the furniture managers assumes everything is thrown in combustible. However, the municipality does not have a good overview of this due to administrative capacity. The products going to recycling stations has been stored for over two years. Still, the furniture manager stresses that they do try to use some of these materials where possible to design other products (e.g., countertops become benches etc.) What is thrown away is often broken frames for desks. There are no fixed times for how often the waste is collected, but this occurs in conjunction with clearing the furniture warehouse once or twice a year. Still, most of this is put aside while waiting to become part of a new redesign project.

So far, there have been few repair or redesign efforts involved in this initiative. The municipal enterprises do not have the budgets for this, instead using the furniture until it becomes non-usable – the furniture manager assumes. Also, Asker municipality did not have any agreements on redesign or repair in 2024 but are planning to invest more in this from 2025. For example, they have put in place a framework agreement with several players in repair/redesign with effect from 01.12.24.

3.4 Practices of Initiative

Applying SPT, the Reuse of Furniture initiative involve three key elements:

- **Materials:** Used office furniture, materials for refabrication or fixing broken furniture. Access to sufficient furniture combined with the ability to repair previously used furniture is key for actors to be able to choose used furniture as opposed to new. Loopfront database.

- **Competences:** Knowledge about existing furniture in use, overview of what state such furniture is in and potentially what needs to be replaced or fixed. Subsequent competences within repairs or refabrication of furniture. In the case of Asker, there is one person who is responsible for coordinating and keeping this overview. Loopfront database is key to ensure this competence.

- **Meanings:** This initiative, at the municipal level, is founded in several areas of interest, which ensures the continuation of the initiative. For this initiative to be implemented in the daily activities of the municipality it had to prove to be financially responsible, and it is a way for Asker municipality to save money, meaning it has a **financial** aspect. Furthermore, there is a **social** aspect of this as the initiative is creating job opportunities for people in the municipality who previously have been unemployed. Finally, the initiative is rooted in an **environmental** objective, with consequences for both *carbon emissions* and *resource depletion*.

Together, all three elements are essential for the continuation of the Reuse of Furniture initiative.

The main objective of the Reuse of Furniture initiative is reusing furniture and interior instead of buying new. The practices are therefore varied. Much of the daily practices revolve around information sharing and spreading awareness of the initiative and the potential benefits of it. From the interview it was made clear that one of the main challenges is to mainstream this practice, in order to make it the natural choice for relevant users of the initiative. With this objective in mind, one strategy is to standardize the type of furniture, with regards to use and aesthetics, to make it easier to repurpose furniture later.

Furthermore, information and experience sharing is important in order to inspire the upscaling of the reuse of furniture initiative. On a day-to-day basis this means to interact with management and employees in the businesses in the municipality and putting effort into changing the role of and the practices of interior architects. The furniture manager explains this as: "In the future, we will not have an interior designer who comes in and tells us what it should look like and what furniture we should have. We will have someone come in and help us map out what we have and how it can fit into a new building". For reuse of furniture to become the

new standard in the municipality, the practices include informing about the initiative, the furniture warehouse, about the opportunities for reuse and the benefits of this.

There is a physical and a digital dimension to this work. The physical dimension includes the moving of furniture from the old locations, storing in it a warehouse, and then moving it to new locations. When speaking about the warehouse, the furniture manager explained that this initiative may differ from similar initiatives as the larger municipalities have huge schemes, with solutions from transportation. She elaborates and tells how the furniture is gathered in private cars, how teachers or other employees help to carry the furniture, and other examples of how this initiative is based on small-scale manual labour and cooperation. The initiative also includes repairing and redesigning worn or broken furniture. For this, they cooperate with municipal work centres, such as Nedre Sem barn, where there are cabinetmakers, as well as a sewing department that can mend or redesign furniture that would otherwise not be reused.

At the digital level, the practices include the mapping, weighing and registering of furniture in the Loopfront platform, which allows for the extraction of figures used for information sharing about the effects of the initiative. A part of this practice is registering savings, meaning CO_2, money and waste, manually. In Asker they have gathered everyone who works with reuse in the municipality into a team, this way the expertise on reusing materials is spread around the municipality. This team is also key for the municipality to create goals and visions for reuse initiatives.

3.4.1 Materials

Different types of **furniture and inventory** play the main role in this initiative, and these furniture must be "robust" and standardized so they can be used in different settings.

The furniture manager points out that both good **reference projects** and **numbers** are important drivers for keeping such projects going. She used an example on this from the previous reuse initiative in the municipality (the forerunner of Reuse of Furniture), where they got figures on how much money, CO_2 emissions and waste avoided comparing to buying new furniture. However, she problematized how savings here were counted as compared to buying new things: "I hope that the municipalities would not have thrown everything away otherwise. It was usable furniture. But these numbers are equivalent to having thrown everything away and only buying brand new products. There are a lot of people who still do it, but as a public business, I don't think that would have been the case for us. Nevertheless, our numbers after the pilot project were so promising that a memo was written to the municipal director's management team saying that this should be done in operation, and the municipality hired a furniture manager [me]."

The furniture manager does a lot of manual work; measuring and weighing products in the inventory – with the help of students for three weeks in the summer – and she has entered all this data into the **database**. Furniture manager: "So, there is a lot of work with all this mapping,

and a lot of administrative work with reuse. The easiest choice would have been to buy new furniture."

Moreover, the municipality's **furniture warehouse** (600 sqm) from 2019 is important to store furniture that cannot be sent to a new location immediately. **The reuse platform** developed by Loopfront serves as a mapping tool and is important to have an overview of all available furniture for reuse within the municipality, to manage, do logistics, and be able to create good reports. Connected to this is the **innovation agreement** between Loopfront and Asker municipality with the following goals:

- Simplify and automate product registration
- Integrate Loopfront with Asker municipality's ERP system
- Make it possible to order 3rd party services such as repair or logistics
- Make it easier to order used products
- ones Ensure that ALL employees in the municipality have access to Loopfront to be able to reuse furniture, fixtures, building materials and ICT equipment in construction projects and daily operations

The furniture manager explained the success of this initiative has to do with Asker municipality, when established in 2020 being founded on the **UN sustainability goals**. This gave increase weight to the argument of the sustainability of making this initiative a permanent part of the operations in the municipality. According to the manager, the Reuse of Furniture initiative hits the triple bottom line of economic, climate, and social sustainability. The social dimension was covered as much of the refabrication, fixing and mending of furniture is organized through work training by the Norwegian Labour and Welfare Administration as well as work centres for people with disabilities. Moreover, she pointed to the importance of having the **"right type of people" -** municipal employees who are passionate about reuse and the environment and who actually make it happen. **Networks** for sharing experience and expertise within and between municipalities is crucial, and there is as well a need for some form of **transport service** for moving furniture between locations. Not least, the pressing economic situation in Asker was seen as an "advantage", as it forced putting reuse on the agenda due to possible economic savings.

3.4.2 Meanings

In an email exchange with the furniture manager, we asked her why she works with this, and what it means to her. To this she replied: "It is rewarding to see that employees are inspired to reuse and get good numbers in reports that the work that is done actually has savings in both the economy and the climate.

On the municipality's website, the furniture manager states:

"Being able to develop a new position in Asker municipality is a lot of fun, especially in an area that is new and important for both the environment and the economy. I also meet an incredible number of employees from all over the municipality, who are very nice, and learn a lot about how everyone works in Asker municipality. Also, when an employee from a nursing home experience that they cannot afford a piece of furniture but can come and pick up the furniture they need from the furniture warehouse, then I feel that this is right."

We further asked her about her previous experience with reuse initiatives, to which she replied that she has no professional experience with this before her employment in Asker, only personal experience and interest. The latter is an important point, because many initiatives for reusing and repurposing of materials are dependent on initiative takers and engaged individuals being driving forces of change.

For this initiative to upscale, it must be rooted in several areas of interest for the municipality. In this case, the initiative got footing after proving to be financially sustainable for the municipality as a business. Furthermore, it has the environmental dimension. Thirdly, the social dimension of creating jobs, like the work centres in Asker providing work to people who has been outside the workforce. This threefold sustainability perspective strengthens initiatives and emphasize their importance, and potential benefits. When asked what it will take for employees in the municipality to use initiatives like this more in the future, the manager replies that using reused materials needs to be easier than buying new. She explains: "Here, I think Asker has come a long way. We are a municipality that no longer buys new office furniture or buys on framework agreements on the purchase of second-hand. Because we are well acquainted with our reuse of furniture, we receive a lot of donations from private actors, which means that we also receive some nice furniture for free".

3.4.3 Competencies

The furniture manager explained what kind of competencies were needed for her position:

"I'm an **interior designer** myself, and it wasn't something that was a requirement in the position. However, the person who had carried out that trial project [in Asker municipality] had noted that it may be an advantage if the furniture manager has a **background in interior design, because then you can see the big picture when you put the furniture in**. It's an extreme puzzle to walk around and place one table in there, and that chair over there, and you must go and map, think and plan for the long run. It is incredibly demanding and takes a significant amount of time.

Moreover, **you have to be a little concerned with project management and logistics,** because there is a lot of mapping. But I think that if you have **an interest in sustainability initiatives, most people will be able to fill this role.** I had worked in sales before I came here, so I had worked with something completely different. But I was good at **setting clear boundaries for customers**. I already had that experience with me, to be able to tell people no, which has been very helpful in this demanding role.

Then again, things are a little different when you work in the municipality. You have to **write a lot of reports, cases, documents, and notes. Present things**. That is kind of the role as Furniture Management, because we **share a lot of what we do with others**. I often present what we do in different networks and at conferences and such. There is little to no requirements for the role, but being proficient in **sharing is very important**. Sharing what is being done, and where you do it right, and also to hear what others have achieved and how, is in a way essential".

For this initiative to upscale, it is important that more actors are involved in the municipality. In the interview, the manager explained that the employees must eventually learn how to properly use the Loopfront platform, in a meaningful manner. Cooperation in the registration of materials for reuse is highlighted as key. In 2024, the platform was improved in cooperation with the municipality, to make it easier to use. If reuse is difficult, then it will create unnecessary barriers. The furniture manager therefore underscores the importance of the platform being user friendly, and that the process does not require extensive knowledge of materials or products to reuse.

Another area where there was much potential for **improving competencies was related to evaluating and reconsidering furniture needs and aesthetics.** As previously noted, the need to streamline the furniture for future reuse of products is an area of particular concern. The manager emphasizes the need for furniture to be practical and urge the focus to be on *needs* rather than *visual preference*. She explains:

"I'm primarily concerned about people's *needs* rather than *wishes*. There are many people that are overly concerned with details that may make the reuse of furniture challenging. I therefore urge all to focus on the practical aspects of furniture rather than the purely aesthetic. We have situations where someone orders a grey desk or a white one, to replace their fully functioning wooden desk. To me this raises the question of whether we should throw away something that works just fine solely because aesthetically you prefer something else? To me the answer is **no**, you can use it until it is no longer working".

3.5 Actors – carriers of practices

There are many actors involved in the reuse of furniture initiative in Asker. At the very center is of course **the furniture manager.** As furniture and interior manager, she is responsible for all the municipality's projects relating to new buildings and renovations. Early in the process, she maps out furniture and interior to be used further or can be retrieved from the warehouse. Some furniture can also be redesigned where needed. She is also close to the work of acquiring new furniture. And she works with the municipality's framework agreements for the purchase of used and new furniture.

The goal of the furniture manager is to contribute to sustainable choices in furnishing for all buildings and employees in Asker municipality. She explained what was unique with her position and praxis compared to other reuse initiatives:

> "There are a lot of people who work with reuse in Norway to operate a warehouse and a digital reuse platform. But I have developed it a little more **strategically** and see that where we can make a big difference **is through projects**. It has to be planned very well, and I have to be involved early, and I'm very involved in all the **real estate businesses**. So, I'm in the property department, which I think is correct for the position."

In addition to this actor, we have identified six other groups of relevant actors for scaling up the practice of reuse of furniture.

First, **employees in Asker municipality**. In addition to the manager, there is a team assembled with all the people working with reusing materials (not just furniture) in the municipality. This team is important for reusing materials to be integrated into all aspects of the municipality's activities. Furthermore, this team develops plans, strategies and visions for reusing materials together. Second, **municipal departments in need of furniture** due to relocation, expansion or other reasons. The furniture manager underscored the importance of these groups to have sincere interest in acting financially sustainable. This is still an important motivation for reusing furniture.

Furthermore, the **suppliers** of activities related to the refabrication, mending or repurposing of existing materials. For reuse to be financially sustainable, it is key to have good framework agreements with suppliers of these types of services. In the interview, the furniture manager told us that: There are these services, such as architects and interior designers, that must change their practices. And that applies both to the interior, but it also applies to the architects' part in relation to building materials and the buildings themselves. For reuse of furniture to become the standard, **interior designers and architects** must internalize this way of thinking and familiarize themselves with the rules, regulations and opportunities it presents.

The fifth group of actors is **the future users**. Per now, there are 14 municipalities in Norway that are taking part of the network and that, in time, may include reuse of furniture in their operations in a manner similar to what Asker is doing. Lastly, **citizens** are mentioned as the potential "next step". Citizens deliver a lot of materials to the waste stations that may be completely reusable. This may be a way for more furniture to be included in the reuse circle, and if the municipality cannot use some of it, there may in the future be room for private users to collect the furniture.

3.6 Environmental Assessment of Initiative

The environmental impact of the Reuse of Furniture initiative is primarily assessed through the CO_2 savings generated by reusing furniture and inventory instead of discarding them. Loopfront estimates savings in three different values: financial savings, CO2-emissions savings, and waste savings. The financial savings are operationalized through the sum of the estimated cost to buy the materials. Savings of waste is estimated by the sum of the weight of the material. Loopfront estimates climate footprint in CO2-equivalents. The number emissions savings is the sum of the manually registered values for category and weight, and the automatically estimates which are generic extracts gotten from the open resource EPDs and the one Click LCA Database. Loopfront started using the EPD data two years ago.

3.6.1 Registering furniture in Loopfront

When registering a piece of furniture, you start by taking a photograph. Loopfront will then, using AI, suggest a category of furniture. Thereafter, one adds measurements and weight and other relevant information about the product, which allows for the database to calculate savings of waste, in kilograms. Based on the weight and the category, Loopfront suggests an estimated climate footprint. There are some categories which are not yet included in the database, and then it is possible to register manually.

The screenshot below shows the Loopfront platform when estimating climate footprints, explaining how this value is based on category, unit and weight, and is automatically estimated.
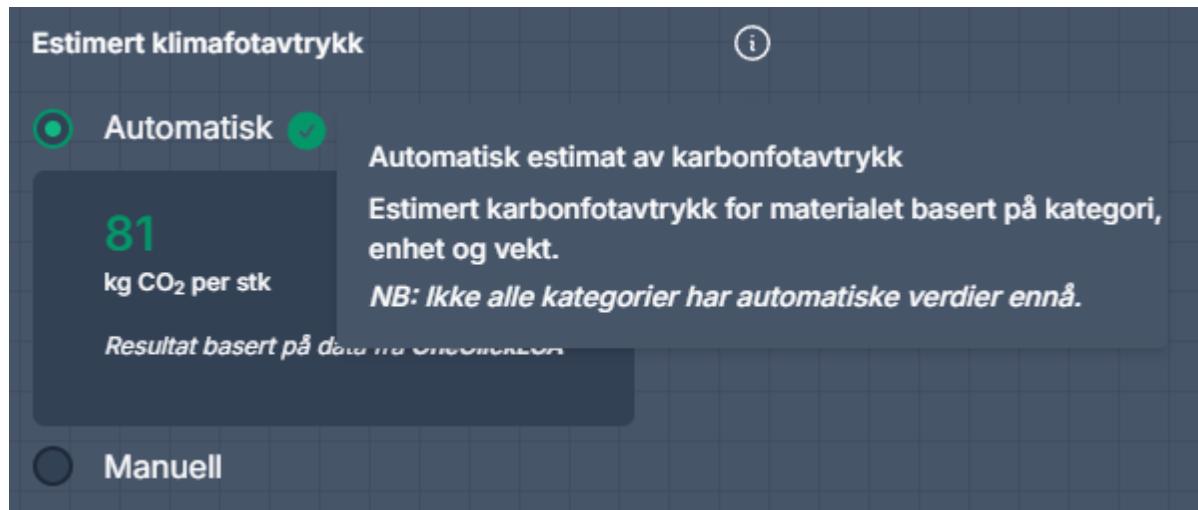
There are several product types registered in the Loopfront database. This includes:
- Acoustic furniture
- Lighting
- Tables
- Ergonomic equipment
- Wardrobe and closet
- Shelf and chest of drawers
- Desks
- Sofas and armchairs
- Data & Accessories
- Audio and video

The total number of products registered as of 23.01.25 was **18 089** products, including both furniture, ICT equipment and building materials. Within the Loopfront database, it is also possible to see the number of products registered within a chosen category. As of 23.01.25, these were the numbers for the five most popular product categories:

- Chairs: 1000
- Tables: 630
- Shelf and chest of drawers: 720
- Desks: 500
- Wardrobe and closets: 550

3.6.2 Extracting the data from Loopfront

If you are a registered administrator for your organization in Loopfront, you can access reports that provide overviews of savings over a given period of time. These reports include all furniture

that has been moved in storage, ordered through the marketplace or donated, all of which generates savings to the report side. When you export these reports for a given period, it will look like this - the left column showing savings in money, the middle column savings of CO_2, while the right column savings in waste:
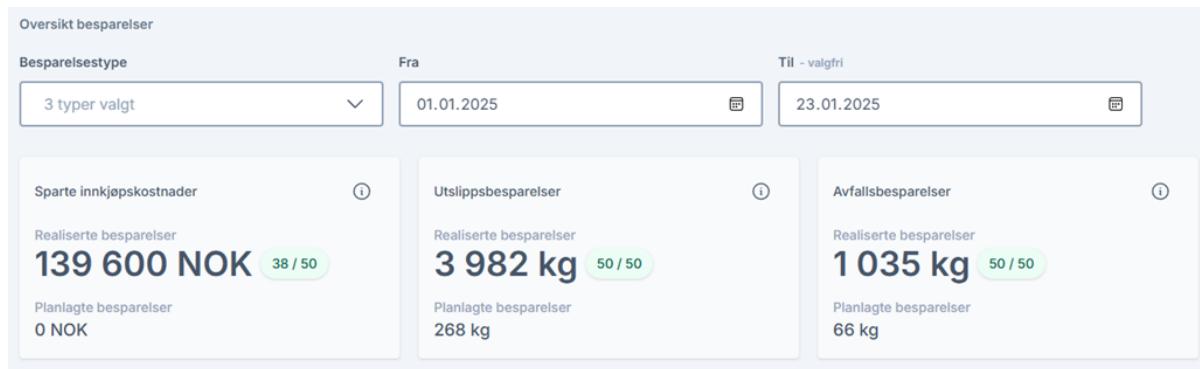
Examples of savings

The database also contains number of orders for chosen periods. Note: it is not possible to get the number of products per order, therefore, orders can contain multiple products. Here, we have selected number of orders for a longer and a shorter period:

- From January 23, 2024 to January 23, 2025: 271 orders
- January 1 to January 23, 2025: 6 orders

Further, the database can provide information about the weight of goods sold. We have selected the same two periods (longer and shorter):

- from 23 January 2024 to 23 January 2025: 11 tonnes
- 1 January to 23 January 2025: 355 kg

The database gives reports on savings in CO_2, money and waste. For the whole inventory, the following savings in CO_2 were extracted for the two selected periods:

- from 23 January 2024 to 23 January 2025: 40.7 tonnes
- 1 January to 23 January 2025: 1.12 tonnes

Moreover, the following financial savings were reported (again, these are calculated as savings compared to a newly purchased product):

- From 23 January 2024 to 23 January 2025: NOK 1.389 million

- 1 January to 23 January 2025: NOK 52,600

It is also possible to get reports on savings by different product types. The picture below shows savings in the category "chairs" on some selected days:

Besparelsesoversikt

Total økonomisk NOK	Totale utslipp kgCO2	Total vekt kg
65 000	3 108	480

Filter | Sorter | 4 filtere X | Sortering: Nyeste | 1 - 5 av 5 resultater.

	DATO	FINANSIELL (NOK)	UTSLIPP (KGCO2)	VEKT (KG)	TYPE	HANDLING
HE	20. jan., 2025 13:41	45 000	2 418	300	Ordre	👁
HE	20. jan., 2025 13:36	0	81,28	20	Ordre	👁
HE	2. jan., 2025 15:07	0	126,053	30	Ordre	👁
HE	2. jan., 2025 15:06	0	210,088	50	Ordre	👁
HE	2. jan., 2025 14:56	20 000	272,32	80	Ordre	👁

Example: Chairs

Reuse of Furniture is a relatively new project, still the number of users is increasing rapidly. Until October 2024, there were only five active users in Asker municipality. In October, users began to be invited among employees and by January 1st 2025, there were around 200 users. From January 1st to 23rd 20025, this grew to 270 users in total.

3.7 Concluding Remarks

Reuse of Furniture initiative focuses on the reuse of furniture internally in Asker municipality through a digital platform, developed by a Norwegian start-up company, Loopfront. In this baseline assessment, our data consisted of a product flow for 2 periods (from January 1th to January 23rd 2025 and from January 23rd 2024 to January 23rd 2025), one in-depth interview, and a pre-meeting and email exchanges with the furniture manager in Asker municipality.

The main practice of this initiative is reusing furniture and interior instead of buying new products. This main practice consists of various sub-practices, including mapping, weighing and registering furniture in the Loopfront platform, creating goals and visions, streamline

demand for furniture within the municipality and visit, talk to management and employees in the businesses in the municipality, and running the furniture warehouse.

There are several present and potential future carriers of these practices, including municipal employees in Asker, other municipalities, suppliers, architects and interior designers and citizens.

These practices are built up by various meanings, materials and competencies. For example, different types of furniture and inventory play the main role in this initiative and good reference projects and numbers are important drivers for keeping such projects going. The reuse platform and the warehouse storage are certainly important. Further, working with this initiative feels rewarding, inspiring and a lot of fun. It is an advantage to have experience with interior design (to see the "big picture"), to be able to do project management and logistics, presenting the initiative and sharing experiences, and being able to influence people to change practices. Still, most important is to an interest in getting this going.

Finally, for further assessments, it is important to note that the reuse platform is quite new. Thus, the numbers on savings and the experiences reported here mostly reflect efforts carried out and results from the forerunning projects on reuse of furniture in the municipality.

Also, we expect to see that the numbers on savings (CO_2 emissions, money and waste) will increase in the mid-term and final assessments, as more people, later also those in the follow-on municipalities, will start to use the platform.

3.8 References

Norway's first full-time furniture manager | Asker Municipality
Furniture manager changes purchasing habits | Asker Municipality
Asker municipality enters into new innovation partnership with Loopfront for increased reuse

4. CSE Initiative in Latvia: Analysis of Nomales

Authors: Jānis Brizga[3], Dzintra Atstaja[3], Inese Mavlutova[3], Inga Uvarova[3], Marija Korabovska[3], Kristaps Lešinskis[3]

3) Banku Augstskola - Shcool of Business and Finance, Riga, Latvia.

4.1 Presentation of Initiative

The Exchange Point "Nomales," operated by Clean R, Ltd., is a pioneering initiative promoting circular and sharing economy (CSE) principles in Latvia. Launched in October 2023 as part of the bigger integrated LIFE project Waste to Resources, it facilitates the reuse of construction materials, household electronics, and furniture, helping reduce landfill waste and enhance resource efficiency. Financially, the initiative benefits from EU LIFE project funding, covering a portion of operational costs, while long-term sustainability planning considers cost efficiencies and potential savings from avoided waste disposal. The initiative provides individuals with an organised platform for exchanging reusable materials, thereby extending product life cycles and minimizing environmental impact.

The infrastructure supporting the initiative includes modular buildings at the Clean R-operated construction waste site in Rumbula. The facility, initially spanning approximately 50 square meters, has been expanded to 500 square meters to accommodate growing exchange activities. Dedicated containers are used to sort and store different materials. Maintenance requirements for the infrastructure are minimal, though potential expansion may necessitate additional space to manage increased material flows. Currently, the number of visitors remains low, and the initiative does not include refurbishment services, as only functional materials are accepted without verification.

The initiative primarily targets construction and demolition waste, a significant contributor to landfill volumes, along with electrical and electronic products and furniture. Categories of collected materials include:

- **Construction and demolition waste**: concrete, bricks, tiles, wood, metal, plastic, insulation, paints, and adhesives.
- **Electrical and electronic products**: mobile phones, computers, kitchen appliances, household equipment, and tools.
- **Furniture**: sofas, tables, chairs, shelves, office desks, and beds.

Accepted materials undergo sorting and assessment for potential reuse. Suitable items are listed in an inventory for redistribution, while non-reusable materials can be disposed of for a fee.

The platform accepts materials from both private individuals and legal entities, including housing associations and property managers. Items may be new or used, and while quality standards apply, aesthetic perfection is not required. To ensure fair distribution and practical reuse, volume limits are imposed on each contributor, with unsuitable materials subject to a disposal fee.

By providing a centralized collection and exchange point, Nomales fosters circular economy practices by reducing waste generation and increasing material reuse. Instead of discarding valuable materials, contributors can offer them for reuse by others in construction, repair, and renovation projects. This approach conserves resources, reduces raw material extraction, and minimizes carbon emissions linked to waste disposal and new material production.

Moving forward, expanding material categories, enhancing digital distribution, and integrating educational campaigns could further strengthen the initiative's impact, making it a leading example of circular economy implementation in Latvia and beyond.

4.2 Case Specific Methodology

4.2.1 Contextualization of Methods

The case study tailored the general methodologies outlined in section 1.4 to the specific challenges and opportunities presented by the Latvian context. This included mostly aligning with local data availability. Specific adjustments involved designing a tracking system for material flows, engaging business stakeholders, and accounting for data constraints. The methodology ensured that the social, economic, and environmental dimensions of the initiative were comprehensively evaluated.

4.2.2 Selection and Implementation

The study employed a mixed-methods approach to provide a multidimensional perspective on the initiative. Qualitative methods, such as stakeholder interviews and observational studies, captured operational insights and user experiences. Quantitative methods, including surveys (in process) and material flow tracking, provided measurable data on participation and environmental impact.

The environmental impacts were assessed by analyzing the weight of key waste categories—construction, electronics, and furniture—and applying CO_2 emission factors. This integrated approach allowed for a balanced assessment of both the initiative's processes and its outcomes.

4.2.3 Collected Data Overview

The data collection phase included:
- Semi-structured interviews with stakeholders (e.g., Clean R representatives, municipal partners, and users) to explore operational dynamics and perceptions of the case.
- Material flow tracking for quantifying collected and redistributed materials, including their types and conditions for the first operational year (October 2023 – October 2024).
- Surveys targeting users and contributors to assess their motivations, satisfaction, and feedback (still in process).
- Site observations focusing on infrastructure efficiency and waste handling processes. Together, these data sources formed a robust evidence base for evaluating the initiative's performance.

4.3 Case Activities/Flow

The initiative's activities follow a structured workflow aimed at maximizing material reuse and ensuring efficient waste management. The core activities include the collection, sorting, and distribution of reusable materials, with operational processes designed to enhance logistical efficiency and accessibility.

Collection: Materials and products are collected from contributors, predominantly individual households. Participants bring materials to designated collection points.

Sorting: Upon arrival, materials are evaluated for quality and categorized based on potential reuse. Trained personnel assess the condition of items and classify them accordingly:

- **Reusable materials**: Items that meet quality standards are prepared for redistribution.
- **Non-reusable materials**: Items that do not meet the reuse criteria must be disposed of as waste, with disposal fees applied where necessary.

Storage and Infrastructure: Collected items are stored at the Exchange Point 'Nomales' facility, which includes dedicated sections for different material categories—construction materials, electronics, and furniture. The facility is equipped with storage areas for the redistribution of items – closed containers. However, there are no good storage spaces for large items such as furniture and large construction materials.

Distribution: Reusable materials are made available to the public through the initiative's online platform, www.lietovelreiz.lv. Interested individuals and organizations can browse available materials and arrange for pickup.

4.4 Practice(s) of Initiative

The Exchange Point "Nomales" initiative fosters a culture of reuse by integrating various social and technical practices associated with circular and sharing economy principles. The initiative is driven by resource conservation goals, ensuring that construction and demolition materials, as well as household electronics and furniture, are reused rather than discarded.

4.4.1 Behavioural and Social Practices

Participants in the initiative demonstrate a commitment to sustainability, opting to donate and collect materials rather than purchase new ones. A key behavioural pattern is the preference for material reuse, particularly in construction and home improvement projects. The initiative's emphasis on free exchange fosters a community-driven approach, where individuals engage in sustainable consumption behaviors. Despite the growing interest, further research is needed to understand the full extent of behavioural motivations behind participation.

4.4.2 Engagement and Community Participation

Public engagement occurs primarily through the Lietovelreiz.lv platform, where materials are listed for exchange. Data on exchanged materials are tracked, providing insights into usage trends. However, community engagement remains limited, with participation mainly from individual owners rather than businesses or charitable organisations. Future expansion efforts could incorporate collaborations with charities or construction companies to increase material circulation and accessibility.

4.4.3 Cultural and Institutional Factors

Latvia's cultural emphasis on resourcefulness and environmental awareness supports the adoption of circular economy practices. The initiative benefits from institutional backing, particularly from Zero Waste Latvia and Clean R, whose advocacy aligns with broader sustainability goals. The lack of economic incentives does not deter participation, as sustainability awareness continues to grow.

4.4.4 Practical Knowledge and Technical Expertise

The effective operation of the Exchange Point "Nomales" is grounded in a blend of practical knowledge and technical expertise, ensuring that materials are collected, processed, and redistributed efficiently. A core competency involves the sorting and categorization of materials, assessing their safety and potential for reuse. This process requires familiarity with waste management regulations, particularly concerning hazardous materials, to ensure compliance with environmental and safety standards. Additionally, logistical coordination plays a crucial role in managing material flows, from collection and storage to distribution. Efficient storage solutions and transportation planning help optimize resource use and minimize waste.

Beyond technical operations, public engagement strategies are essential to the initiative's success. The digital platform Lietovelreiz.lv serves as a vital tool for connecting users with available materials, fostering transparency and accessibility. By integrating reuse and sharing practices, "Nomales" embodies circular economy principles, reducing overall consumption. The free-access model eliminates financial barriers, allowing materials to be exchanged freely, akin to free shops. Moreover, adaptive reuse ensures that salvaged construction materials find new purposes, reducing the demand for virgin resources and promoting sustainable consumption.

Through these integrated practices, "Nomales" strengthens a culture of reuse, aligning with circular and sharing economy goals while engaging both individuals and organizations in sustainable material management.

4.4.5 Elements of Social Practice Theory in the Initiative:

The "Nomales" initiative embodies the core principles of SPT by integrating three fundamental elements: materials, competencies, and meanings.

Materials

At the heart of "Nomales" is the exchange of second-hand and repurposed items, including reclaimed construction materials (e.g., tiles), household electronics, and furniture. These

materials act as tangible resources that enable reuse, diverting waste from landfills and promoting resource efficiency. The initiative facilitates the redistribution of materials that retain value, ensuring they are accessible to new users rather than being discarded.

Competencies

The initiative relies on specific skills and expertise essential to its operation. Repairing, refurbishing, and repurposing items are critical competencies, enabling contributors and participants to extend the lifespan of materials. Additionally, skills in organizing exchange processes, waste sorting, and stakeholder collaboration ensure that operations run smoothly. Infrastructure management and logistical coordination further enhance the initiative's effectiveness, supporting the circulation of materials within the community.

Meanings

The cultural and social meanings attached to reuse and sharing drive participation in the initiative. Environmental consciousness, community solidarity, and the ethical value of waste reduction shape public engagement. By associating recycling and reuse with sustainability and shared responsibility, the initiative fosters a shift in perception—moving from a linear consumption model toward a more circular and community-driven approach.

Carriers of Practice

The success of "Nomales" is supported by a diverse network of actors, each playing a distinct role:

- Community Members: Residents who donate and collect items, actively participate in the exchange.
- Organizers: Individuals who facilitate the exchange process, manage inventory, and promote awareness of reuse practices.
- Third Sector Organizations (NGOs): Non-profit entities, such as Zero Waste Latvia, that advocate for waste reduction and sustainable consumption and run the online exchange platform.
- Institutional Stakeholders: Municipal representatives and waste management entities (e.g., Clean R) that contribute to infrastructure and operational frameworks.

4.5 Environmental Assessment of Initiative

The environmental assessment of the initiative focuses on evaluating its impact on carbon emissions and waste reduction through material reuse. By substituting reused materials for newly manufactured ones, the initiative prevents emissions associated with production and disposal processes. Preliminary findings indicate a significant reduction in waste sent to

landfills, decreased energy consumption, and an overall lower carbon footprint. Standardized measurements of material weight and composition are recorded for transparency, with detailed data available from the past year. In its first year of operation, the initiative successfully diverted 8.7 tons of waste from landfills. Most of the materials collected are either reused or recycled, ensuring that only minimal waste requires disposal. When waste must be discarded, it is carefully categorized and sent for recycling, limiting landfill contributions. Packaging is kept to a minimum and is primarily used for transportation purposes.

The table below summarizes the waste streams, their total weight, and their corresponding CO_2 footprints:

Waste stream*	Sum of weight (kg)**	CO2 – footprint per Kg. according to *	Total sum of CO2 - footprint (kg)
Construction waste	8218,5	0,292	**2406,82**
Electronics (E-waste)	184,2	13,2	**2438,64**
Furniture (Bulky Waste)	285,95	0,802	**229,14**

Numbers and waste stream categorization; source: Executive summary of waste analysis by Metabolic, n.d.
***Source:* Nomales24_with_classification (excel sheet), n.d.

Energy and water consumption data for the initiative is not available separately, as the exchange point operates within a larger industrial site. However, consumption is expected to be minimal since the site has no heating and only requires electricity for lighting. The exchange point is located within the construction waste sorting and recycling centre "Nomales" in Stopiņu district, operating on a structured schedule throughout the week. Energy use at the site is limited to electricity, with no detailed consumption records. Storage capacity presents some constraints, particularly for large-sized materials, and inventory management is currently not extensively documented.

The exchange point primarily serves individual users, with records of material types and quantities maintained in an operational dataset. Collaboration with private operators remains limited, aside from partnerships with Clean R and BAO, which manage hazardous waste. Some small quantities of waste that fail to meet quality standards are processed through disposal sites for a fee. Construction debris with minimal contamination is recycled or exchanged for sorted materials such as rubble and soil.

Accessibility to the exchange point is a key consideration, with most visitors using personal vehicles due to the site's distance from public transportation. Employees and volunteers also

rely on personal transport, as no alternative mobility options are in place. While scaling the initiative is feasible without significant financial investment or regulatory hurdles, engaging additional partners and participants is essential for growth. Expanding operations to handle larger material volumes may pose logistical challenges, particularly in storage and management. If participation exceeds 200 individuals, resource constraints could become a limiting factor. Despite these considerations, the initiative continues to function as a vital platform for waste reduction, supporting circular economy principles and fostering sustainable consumption practices.

4.6 Concluding Remarks

The "Nomales" initiative has established itself as a promising model for sustainable construction waste management, integrating circular economy principles into local practices. Facilitating the exchange and reuse of materials has demonstrated tangible environmental benefits, including significant waste diversion from landfills and a reduction in carbon emissions associated with new material production. The initiative's first year of operation saw the reuse of 8.7 tons of materials, highlighting the effectiveness of such a model in minimizing environmental impact while fostering community participation.

While the "Nomales" initiative has demonstrated success, there remain opportunities for further enhancement and study. One significant challenge is optimizing storage and logistics to accommodate an expanding number of participants. Limited storage capacity, especially for larger materials, may hinder scalability. A more advanced inventory management system that tracks material availability and condition in real time could improve efficiency and encourage greater participation. Strengthening collaborations with construction companies and demolition projects could also ensure a more consistent and reliable supply of reusable materials.

Another crucial area for development involves increasing the accessibility of the initiative. Establishing exchange points in more frequently visited locations, such as marketplaces, could enhance public participation and material turnover. This would not only make the initiative more convenient but also reduce transportation-related environmental impacts, as the current site is located in a less accessible area with limited public transport options.

Efforts to raise awareness and foster community engagement should also be expanded. Educational initiatives, workshops, and partnerships with local municipalities could help build a stronger culture of reuse and ensure a steady demand for salvaged materials. Additionally, policy support in the form of tax incentives for material donors or requirements for reuse in construction regulations could further reinforce the initiative's long-term viability.

To gain a more comprehensive understanding of its environmental benefits, a detailed LCA would be beneficial. While preliminary findings suggest significant carbon savings, a more in-depth analysis of factors such as transportation emissions, energy use, and waste reduction could provide clearer insights. Collecting more precise data on these aspects would help refine strategies for maximizing sustainability outcomes and informing future improvements.

As a case study, "Nomales" offers valuable insights for policymakers and practitioners interested in implementing similar models. Its experiences underscore both the opportunities and challenges of circular economy initiatives in the construction sector. Addressing logistical constraints, improving data collection, and expanding outreach efforts could further enhance its effectiveness. With strategic adjustments and continued support, the initiative has the potential to serve as a replicable model for other regions aiming to integrate circular economy principles into waste management practices.

4.7 References

The references include internal documents from Clean R, interview transcripts, and operational records detailing material flows. These sources provide the basis for the study's findings and analyses.

5 CSE Initiative in Poland: food sharing initiative "Jadłodzielnia"

Authors: Przemysław Pluciński[4], Mariusz Baranowski[4]

4) Adam Mickiewicz University, Poznań, Poland

5.1 Presentation of Initiative

The food-sharing initiative *Jadłodzielnia* is a bottom-up, non-profit NGO based in Toruń, northern Poland. Some members of the organization are involved in other social initiatives with a feminist profile and/or urban rights activism, including participation in the national umbrella organization, the *Congress of Urban Movements*.

The association *Jadłodzielnia* operates specifically in the food sector, with a primary focus on preventing food waste through:

1. **Educational activities** for children and school students, including lectures and workshops on waste prevention.
2. **Establishing and maintaining** a network of local food-sharing units, with five currently operating in Toruń. These units are typically large OSB cabinets housing shelves and a fridge. The NGO runs information campaigns on the proper use of these food-sharing points, defining which items can be donated. Users can contribute anything except alcohol and food containing raw meat or eggs. Acceptable items include cakes (preferably pre-packaged), chops, salads, cold cuts, bread—essentially anything that is still safe for consumption but no longer needed.

Jadłodzielnia has no external operator and functions independently. The association sustains a portion of its activities—primarily educational ones—mainly through grant-funded projects.

By providing several spatially dispersed collection and sharing points, *Jadłodzielnia* fosters sharing economy practices, reducing food waste within the consumer chain. Instead of discarding safe, unexpired food, the NGO redistributes surplus food to those in need.

5.2 Case Specific Methodology

5.2.1 Contextualization of Methods

According to the proposal, we will apply the tailored case study approach, based on the participatory and action-research as well as co-creative methods. This will include launching a new food sharing unit in Poznań, based on a previous experience and with practical support of "Jadłodzielnia".

5.2.2 Selection and Implementation

The case selection and chosen research methods led to a complex, iterative, and prolonged process of obtaining ethics approval from the Human Research Ethics Committee of Adam Mickiewicz University. This process took over six months and resulted in a positive recommendation in late January 2025. However, it delayed practical actions by both researchers and supporting NGO members. The planned research activities, including EIA data collection, will be conducted during the first half of 2025, with findings reported in the next reporting period.

5.2.3 Collected Data Overview

Practically, we will employ the following research techniques:

1. **Participatory workshops** – We will conduct <u>4 workshops</u> incorporating elements of action research, culminating in the establishment of a new food-sharing unit.
2. **In-depth interviews (IDIs)** – We will interview <u>ca. 10-15</u> stakeholders involved in the food-sharing unit to gather insights.
3. **Participant observation** – We will observe the workshops in practice and document findings through research notes.
4. **Data collection on food flows** – We will monitor the flow of goods within the newly established food-sharing unit, using both qualitative (types of goods) and quantitative (number/weight of goods) measures.

The planned methodology ensure that the social, economic, and environmental dimensions of the initiative will be comprehensively evaluated.

5.3 Practice(s) of Initiative

The initiative is driven by food waste prevention goals, ensuring that the waste is to be minimized. Food-sharing units and food waste prevention activities help foster an alternative culture of sharing basic goods. To some extent, they challenge the dominant consumerist culture by promoting alternative consumption patterns and social practices and reinforcing values aligned with the principles of the sharing economy and responsible consumption.

It is expected that participants supporting the initiative share a commitment to sustainability, choosing to donate and collect food. A key behavioral pattern observed is a preference for responsible consumption. The nature of free exchange fosters a citizen-driven, community-

based approach, where individuals voluntarily engage in sustainable consumption practices—even when it requires a greater time commitment.

5.3.1 Cultural and Institutional Factors

It is expected that – at least some of the 'users' and supporters – share a value-driven approach which might be translated into sharing economy practices. Institutional backing is to be investigated.

5.3.2 Practical Knowledge and Technical Expertise

It is expected that the process of becoming food sharing practitioner involves social learning processes, both in terms of raising sustainability awareness and practical knowledges. In-depth understandings are to be investigated through IDIs

5.3.3 Elements of Social Practice Theory in the Initiative

Food sharing initiatives as practices share the core principles of SPT by integrating three fundamental elements: materials, competencies, and meanings.

Materials

Food sharing units are to be constructed from second-hand, re-used materials. Infrastructures include the appliances (e.g. the fridge). The tangibility of food to be shared is also to be considered.

Competencies

The initiative relies on specific skills and expertise essential to its operation. It requires basic knowledge on allowed and not allowed food to be shared. It also requires skills in organizing sharing processes, food sorting, providing stable support around the functioning food sharing units. Good infrastructure management (e.g. cleaning) and logistical coordination (sorting) enhance the initiative's effectiveness.

Meanings

The cultural meanings and values around sharing drive participation in the initiative. Environmental consciousness, community solidarity, and the ethical value of waste reduction shape this kind of civic activities.

Carriers of Practice

The operation of food-sharing units is supported by a network of key actors:

1. **Organizers** – Individuals who facilitate the sharing process, manage inventory, and promote awareness of sharing practices.
2. **Community Members** – Citizens who donate and collect food, actively participating in the exchange.
3. **Institutional Stakeholders** – Municipal representatives and waste management experts involved in scaling and expanding the initiative.

6. Comparative Analysis of Initiatives

The CSE initiatives examined within the WP5 in TransScale project share a common objective: to reduce waste, encourage sustainable resource use, and foster community engagement in circular economy practices. Despite this shared vision, the cases analyzed display notable variations in their structure, operational methodologies, and scaling potential. These differences stem from contextual factors, stakeholder engagement models, funding sources, and the nature of materials or products targeted for reuse. Moreover, the approaches to data collection and impact assessment vary, influencing the degree to which each initiative can measure and communicate its environmental and social benefits.

6.1 Case Structure Comparison

Within the shared goal of fostering circular and sharing economy principles, the structural organization of the initiatives varies.

Jadłodzielnia, the Polish initiative, operates as a decentralized, community-driven model with food-sharing units spread across local neighborhoods. Its structure relies heavily on external funding as the initiative works as an NGO.

Nomales in Latvia, in contrast, is a structured initiative operated by the company Clean R, Ltd., as part of the EU LIFE Waste to Resources project and functions as a collection and exchange hub for construction materials, household electronics, and furniture, with a digital listing platform to facilitate exchanges for municipalities in Latvia.

The Norwegian Reuse of Furniture Initiative has a different approach and is a circular economy initiative focused on the furniture of the municipal administration and institutions. The initiative is fully institutionalized, with municipal employees as primary participants, and is supported by a digital platform (i.e., Loopfront) to track furniture reuse. This formalized structure requires engagement strategies to encourage municipal workers to actively participate in reusing materials rather than defaulting to new procurement.

Repair Café Denmark is structured as a decentralized network of independent community-based repair cafés, coordinated under a loose organizational framework. The individual cafés operate autonomously but follow shared principles for repair promoting repair culture and skill-sharing. Compared to the other initiatives, Repair Café Denmark's structure emphasizes more human capital such as volunteers and knowledge-sharing, besides prolonging lifetime of repaired products.

6.2 Social Practices in the Initiatives

The social practices embedded within the initiatives shape participant behaviors, motivations, and long-term contributions to a more circular or sharing economy.

Nomales and the Norwegian Reuse of Furniture Initiative primarily engage participants through structured, institutionalized processes. In Nomales, individuals interact with the platform as users, either donating or acquiring materials, often without deep engagement beyond the transaction. Engagement primarily occurs via the Lietovelreiz.lv digital platform, though community involvement remains limited to individual contributors rather than businesses or charities. Future engagement strategies may involve collaboration with NGOs, construction firms, or donation-based organizations to expand its social impact.

The Norwegian initiative similarly operates within an institutional framework, where municipal employees are expected to reuse materials but may not develop a personal connection to the practice beyond workplace obligations. The lack of individual behavioral reinforcement mechanisms means that participation remains largely procedural.

In contrast, Repair Café Denmark fosters interactive and community-driven social practices. Here, repair is not simply a service but aiming at a collaborative learning process where volunteers and visitors share knowledge and engage in hands-on participation, although collaborative learning not always takes place. The practice of repair takes place through social interaction, mentorship, and collective problem-solving, making sustainability a more tangible and internalized concept. This initiative represents a case where practice-as-entity and practice-as-performance (as outlined in Social Practice Theory) strongly reinforce each other. Volunteers pass down repair skills, and over time, participants could begin to adopt these practices in their daily lives.

A key challenge across all initiatives is sustaining engagement and habit formation. Nomales and the Norwegian initiative require participants to operate within predefined systems, often without fostering a strong social connection to reuse behaviors. By contrast, Repair Café Denmark relies on interpersonal connections to encourage continuous participation of the volunteers. While this model could ensure long-term behavioral change for those involved, it is also more dependent on volunteer availability and community networks to attract people in the first place.

6.3 Comparison of Environmental Data and Impact Assessment

The initiatives approache environmental data collection differently even though both Nomales, Repair Café Denmark, and the Norwegian Reuse of Furniture Initiative have structured data collection frameworks, leveraging material flow tracking and digital inventory systems to quantify resource savings and emissions reductions.

Nomales, systematically record incoming and outgoing materials, tracking their weight and categorizing them based on their potential for reuse. Data collection includes material flow tracking, where items are logged in a digital system upon arrival and departure. Standardized CO_2 emission calculations were done for this report within the Transscale consortium to estimate the reduction in environmental impact from diverting waste from landfills, but it is not something done within the initiative itself.

The Norwegian Reuse of Furniture Initiative integrates digital inventory tracking through Loopfront, a platform that records furniture reuse rates, condition assessments, and estimated CO_2 savings. By monitoring municipal furniture circulation, the initiative calculates the carbon footprint reductions achieved through reuse versus new procurement. The data collection process also includes tracking employee participation, analyzing procurement trends to measure the financial and environmental impact of extending furniture lifecycles. The initiative also documents material degradation over time, assessing the viability of long-term reuse and identifying areas where refurbishment might be necessary.

Repair Café Denmark employs a material flow tracking system to document repaired items, and the reason why items were not repaired. Each repair café logs the number of items repaired, their categories, and whether they were successfully fixed or not. Data is collected across multiple café locations and aggregated over time to identify trends in repair frequency, common issues, and the total volume of diverted waste. Additionally, the initiative tracks CO_2 emission reductions by estimating the environmental impact if product repair prevents new product manufacturing and waste disposal. The dataset includes long-term records, allowing for an analysis of repair success rates and evolving consumer habits.

6.4 Scaling Challenges and Potentials

Across all cases, the common challenge of scaling sustainability practices emerges as a pivotal consideration. Scaling up (integrating initiatives into institutional frameworks and ensuring policy-level support) is more feasible in initiatives like the Norwegian furniture reuse model, which already operates within municipal structures. On the other hand, community-driven projects such as Jadłodzielnia and Repair Café Denmark face hurdles in securing long-term funding and maintaining volunteer engagement. Scaling out (replicating successful models in new locations) has been demonstrated effectively by Repair Café Denmark, which has expanded its network across multiple sites, showcasing the adaptability of its approach. However, other initiatives, particularly Nomales, may struggle to replicate their model without significant investment in infrastructure and stakeholder partnerships.

6.5 Conclusion

While all initiatives contribute to the overarching goals of the circular economy, their methodologies, data collection strategies, and operational models reveal distinct strengths and limitations. Jadłodzielnia represents a grassroots initiative with strong community engagement but remains in an exploratory phase with unverified impact. Nomales provides a structured material reuse framework and demonstrates measurable CO_2 savings. The Norwegian Reuse of Furniture Initiative benefits from digital tracking and municipal integration but faces challenges in repair infrastructure and engagement. Repair Café Denmark is fostering a vital repair culture and has a structured material flow tracking system, which enables it to quantify its environmental contributions (even though the data is not completely precise but more estimates of e.g., the products weight).

Understanding these similarities and differences provides valuable insights into how circular economy practices can be optimized and expanded within diverse socio-economic contexts.