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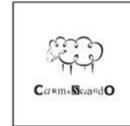


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1. Introduction

This deliverable introduces a framework for a Social Circular Enterprise Business Model to enhance regional development and foster local job creation with engagement of stakeholders at all levels of Frontsh1p and support industrial symbiosis within the Circular Systemic Solutions (CSS) of the Łódzkie region. The transition to a Circular Economy (CE) is ongoing and continuously developed, and there is no one solution regarding the implementation of CSS. As defined by the CCRI, a CSS is fundamentally a cross-sectoral initiative aimed at fostering a circular and climate-neutral economy within a specific geographical area. This systemic approach involves a variety of actors and addresses multiple circularity issues, including actions that cover different sectors while taking into account a life cycle perspective. For effectiveness, a CSS should combine various circular economy business models, consider all enabling and hindering factors, and adopt innovative approaches that go beyond traditional waste management. Furthermore, it is crucial that local policymakers and decision-makers have the relevant information needed to implement, replicate, or expand the CSS (European Commission, 2022).

Within Frontsh1p, the waste from processes of one CSS is a resource for the same or another CSS, to close circular loops and facilitate industrial symbiosis. While innovations within the CSSs aim to generate financial return and create new jobs to substitute previous ones serving a linear economic model, they should include ways to involve the community in their development of circular solutions. To underline these social aspects, this deliverable outlines a detailed 4-step methodology for user determination and community engagement to support business model development. Results of cross-cutting activities to all CSSs, following the CSS regional roadmap are defined by these steps, determined by the methodology:

- Determination of User types and personal Indicators
- Community Identification

- Virtual and physical interaction design
- User Access and Participation

The deliverable reports the results of such co-creation activities and about the possible creation of local social enterprises creating jobs for people at risk of social exclusion. A model of creation of social enterprises is then developed in alignment with these activities. Thus, Social enterprises are included as part of the social involvement task of Frontsh1p. The main section of the deliverable lies in the proposed framework and business model canvas for social circular business models, which serves as a blueprint for establishing local social enterprises. The report concludes with policy recommendations and a strategic roadmap, aimed at replicating and scaling these innovations regionally aligning the proposed business model methodology with the Circupuncture Economy Action Plan, and the Łódzkie monitoring framework, to ensure alignment with the broader objectives of the Frontsh1p project.



2. Background information

2.1 Circular Business models - state of the art

Circular Business Models (CBMs) play an essential role within the Frontsh1p project, as they represent guidance for the implementation of CSS in the Łódzkie region. Circular Business Models for CSSs, as for any circular economy system, imply a little use of resources for a timeframe that is as long as possible, while valorising the inherent processes as much as possible (Geissdoerfer et al., 2020). Therefore, CSSs must rely on a reduction of (raw) resource input and an improvement of processes of which waste shall become a new resource and thus closing the loop. The 4 CSSs objectives of Frontsh1p can be summarised as explained in Deliverable 2.2 *'Regional Circularity Booster Toolkit Development of the operational model and methodology of collecting data, updating, and sharing methodologies to specific groups of stakeholders'*:

CSS1 - A circular approach to wood packaging waste.
<p>Main objectives are:</p> <ul style="list-style-type: none"> • Creation of a new value chain based on wood packaging waste valorization, involving the whole community and implementing the circular economy approach (refurbishing, reusing, recycling, energy recovery); • Coupling of biomass gasification for renewable heat generation and post-combustion capture of CO₂ towards carbon negative emissions; • Exploitation of char as pigment/filler in the plastic industry or as additive for compost; • Exploitation of CO₂ as a foaming agent in the plastic industry.

Table 1. CSS1; Main Objectives. Source: Own compilation.

CSS2 - Waste as Raw material.

Main objectives are:

- CO₂ assisted pre-treatment of agro-industrial waste combined with biotechnological treatments for the obtaining of Free Fatty Acids (FFAs) as component for foaming biomaterials;
- Establishment of oil crops cultivations (i.e., sunflower) in marginal and abandoned agricultural areas to obtain vegetable oils that can be transformed in biodegradable biolubricants and locally available animal feed;
- Production of biobased building blocks (diols and dicarboxylic acids) from second generation feedstock (from regional agro-industrial waste rich in sugars) for the formulation of new compostable bioplastics (compostable bags for Organic Fraction of Municipal Solid Waste collection).

Table 2. CSS2; Main Objectives. Source: Own compilation.

CSS3 - Wastewaters and flue gases as microalgae biomass feedstock.

Main objectives are:

- Draft the framework, Technical and non-technical state of the art, requirements and success criteria to satisfy the implementation of the technological and non-technological solutions required in CSS3;
- Identify measures that have the strongest leverage for a sustainable-oriented improvement of products through Life cycle thinking and ecodesign;
- Develop CSS3 community-based innovation schemes to Reduce liquid and gaseous wastes through Microalgae Biotransformation towards upgraded biogas (biomethane) and bio-based products such as biofertilizers and biostimulants;
- Develop CSS3 demo plant towards bio-based products;
- Collect data in technological, economic, social and environmental dimensions and share them on the RCPB tool.

Table 3. CSS3; Main Objectives. Source: Own compilation.

CSS4 - A circular approach to urban and industrial plastic/rubber waste.

Main objectives are:

- To optimise a high TRL pyrolysis system for chlorinated compounds;
- To further develop a high TRL supercritical CO₂ expansion system for insulating biomaterials;
- To demonstrate low-cost 3D printing for repairing household appliances.

Table 4. CSS4; Main Objectives. Source: Own compilation.

2.2 CSS community engagement overview

The development of Circular Economy (CE) is still unclear. It is thus important to understand societal implications related to the transition, which are not limited to the creation of new jobs (Valencia et al., 2023). This aspect is considered important within the development of CSSs in the Frontsh1p project. The innovative proposals of CSS imply the participation of the community, both actively and inactively. Each CSS implementation plan includes a citizens engagement plan.

As introduced in Deliverable 3.1 '*Implementation plan of CSS1 and Citizen engagement Plan*', citizens engagement in Frontsh1p refers to the involvement of the community in circular practices such as the separation of waste or its reuse or recovery in households; and also refers to the initiatives undertaken by public or private organisations that allow communities to learn about CE and to acquire knowledge that can be put into practice. Stressing on the first example, there are multiple actions with which households can effectively contribute.

Social engagement in CE also extends to regulatory frameworks that shape management processes. This includes the development of organizational strategies designed to enhance the circulation of natural resources within the socio-economic system. By doing so, these measures help minimize human-induced environmental impacts, particularly those arising from waste generation and accumulation. A key

focus is on post-consumer waste—waste generated through consumption, primarily in the form of municipal waste.

Frontsh1p defines the activities of citizens and households for CE as involvement in the following practices and processes:

“– refusing (e.g. not necessary consumption of goods; elimination of unnecessary / harmful consumption),

– reducing (consumption of goods in order to lower the physical flow of matter in economic processes),

– reusing (the multiplication of the use of material goods for their current purpose),

– refurbishing (renewal of material goods in order to restore the original functionality and extend the lifetime),

– repairing (fixing of broken or damage material goods),

– repurposing (finding new applications and functionalities for material objects already used up for their original purpose),

– recycling (processing material goods into new, secondary raw material), as well as activities not directly related to CE, but supporting such practices:

– sharing (using one item / material good together with other households in order to increase the intensity and efficiency of use),

– leasing (rental systems of material goods), and segregation and selective collection in the local waste management system. “ (Frontsh1p, D3,1. UNIBZ. 2022)

Regarding the initiatives of organisational bodies in the public or private sector, different CE supporting activities are listed as follows:

- activities to increase awareness and knowledge
- activities to modify citizen’s behaviour
- activities to involve citizens
- activities to encourage citizens

The concepts of circular business models and community engagement mentioned in this chapter will be used and further elaborated to create a social oriented business model with the purpose to enhance these aspects within the regional context.



Chapter 3 - “4 steps methodology”

A method for determination of users and their interaction and engagement in the community

This chapter elaborates in detail a 4 steps methodology that enables social engagement for businesses, focusing on User Determination and Community Engagement and Interaction. The proposed “4 steps methodology” has been adapted and contextualised from the original method presented in the study “Community Based Innovation-A Method to Utilise the Innovative Potential of Online Communities ` 1 . This methodology emphasizes the importance of reciprocity and engagement, which are equally valid in physical contexts, as we move beyond the predominantly online engagements seen during COVID-19. By leveraging this framework, the core elements of Community Based Innovation, such as user involvement, and collaborative innovation, can be effectively translated to physical interactions. Physical engagement can facilitate more direct observation and feedback, enhancing data collected and the relevance of insights, thus supporting robust business model development in a social enterprise context.

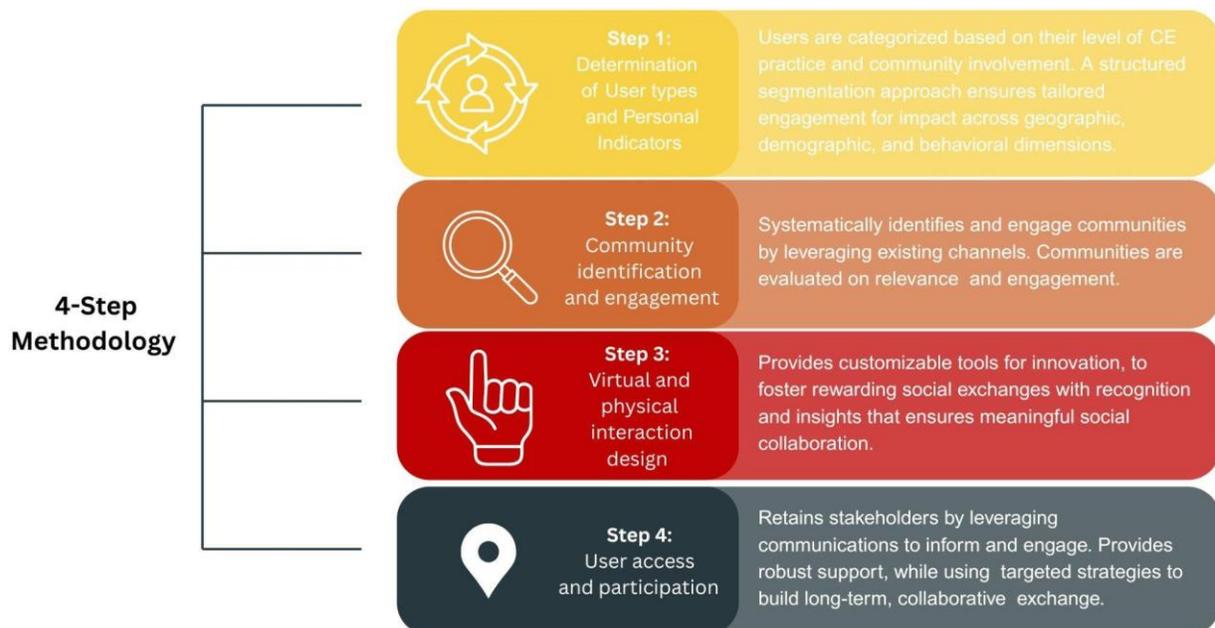
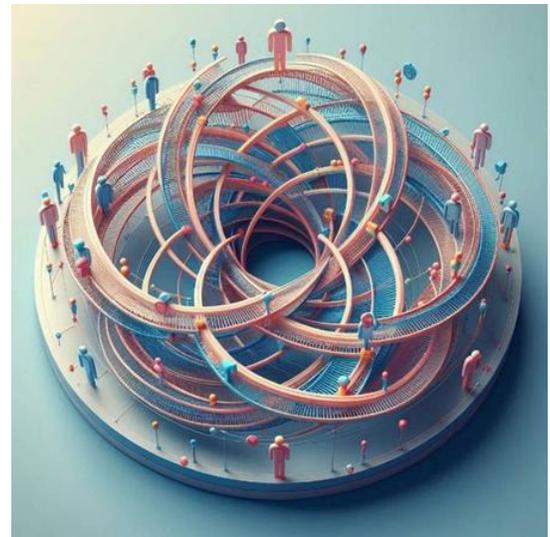


Figure 1. 4-step methodology. Source: Own Compilation.

The methodology includes the identification of users, characterisation of lead users and segmentation criteria. Subsequently, a series of actions and activities that directly and indirectly influence the interactions within the community are described. While the ladder of participation for citizen engagement developed within Frontsh1p focuses on social programs and citizen power, the four-step methodology is about integrating consumer insights into innovation, showing how participatory approaches can be applied in diverse fields. These frameworks can be viewed as complementary approaches to the broader goals of the project, rather than distinguished. Both methodologies seek to achieve tangible outcomes by leveraging the input and engagement of participants. While the Ladder of Participation does so through policy influence, the four-step methodology is directly focused on business innovation. The ladder of participation provides a conceptual framework for understanding different levels of citizen engagement and policy influence, whereas the four-step method offers a practical guide to implementing citizen participation, tailored to specific user types, with defined activities to foster business model adaption.

3.1- Step 1: Determination of User types and Personal Indicators

Successfully implementing Circular Systemic Solutions requires the involvement of diverse stakeholders, each at different stages of engagement with the circular economy. Understanding these users and their roles allows for the design of targeted strategies that support inclusive participation and drive systemic change. Below are four key user categories identified for their unique contributions to the circular transition:



Explorers

Description: Stakeholders with minimal engagement in circular economy (CE) activities.

Example: New businesses starting to explore basic recycling practices, residents beginning to adopt waste segregation at home.

Role: Provide initial feedback on entry-level CE initiatives, identifying barriers to adoption and initial touchpoints for broader engagement.

CSS Context: Participate in pilot programs and basic recycling initiatives, offering insights on user-friendliness and initial challenges.



Connectors

Description: Stakeholders with strong social or professional networks but limited engagement in specific CE practices.

Example: Community leaders promoting sustainability discussions, business networks exploring CE practices through professional associations.

Role: Promote awareness and spread information through social or professional networks, enhancing community and stakeholder participation in CE practices.

CSS Context: Help disseminate information about CE benefits and practices.



Enthusiasts

Description: Stakeholders deeply engaged in specific CE practices but less involved in community-wide or sector-wide initiatives.

Example: Businesses regularly practising waste segregation, local NGOs advocating for sustainable development.

Role: Share practical experiences and successes with CE practices, provide feedback on the effectiveness of these initiatives, and advocate for best practices within their sectors.

CSS Context: Actively engage in the development of circular solutions and participate in their implementation phase.



Champions

Description: Stakeholders highly involved in both CE practices and broader community or sector activities.

Example: Local government officials leading CE initiatives, businesses collaborating on regional CE projects, NGOs organising workshops and community events.

Role: Lead by example, mentor other stakeholders, and offer deep insights into both technical and social aspects of CE. They are key contributors to the development and refinement of systemic solutions.

CSS Context: Lead the implementation of innovative technologies and business models, ensuring integration and synergy for maximum impact.

The following graph shows the level of engagement of each user type. X axle being level of Engagement in CE practices while Y axle presents the community/sector engagement.

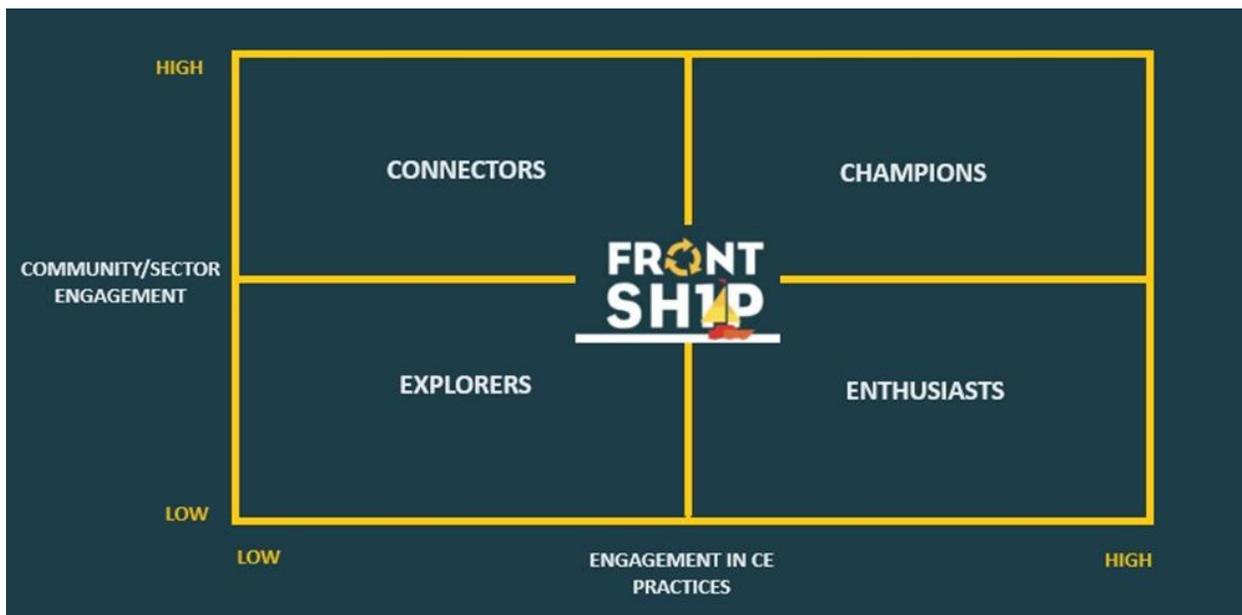


Figure 2. Frontsh1p, Engagement of user types. Source: Own compilation

Identifying and engaging Lead Users—those ahead of market trends with strong insights and innovation potential—is key to driving effective and scalable Circular Systemic Solutions. The following outlines how to recognize and assess these high-impact stakeholders.

1. Key Characteristics of Lead Users:

- Advanced needs and deep technical knowledge in the circular economy.
- Early adopters of new technologies and services, providing valuable feedback and innovative ideas.

2. Methods for Identifying Lead Users:

- Surveys and Questionnaires: Assess innovativeness, creativity, and cognitive styles.
- Idea Contests: Organise contests to surface creative solutions and identify advanced problem-solving skills.
- Virtual Stock Markets: Implement virtual markets to gauge interest and identify potential Lead Users based on investment in new ideas.

3. Personal Indicators for an Optimal Fit:

- Innovativeness and Creativity: Ability to propose novel solutions.
- Domain-Specific Knowledge: Familiarity with circular economy practices, industry standards, and trends.
- Communication Skills: Ability to articulate ideas and provide constructive feedback.

To effectively engage and leverage the diverse capabilities of stakeholders in any given regional context, it is necessary to identify user groups based on segmentation criteria. This process will ensure that each user groups receives tailored communication, resources, and engagement strategies to maximise their contribution to the circular economy transition. and for the successful implementation of Circular Systemic Solutions (CSS).

Segmentation Criteria for Users

1. Geographic Segmentation

Objective: Identify users from key geographic areas to gather diverse perspectives and address regional-specific challenges.

- Local (Neighbourhoods and Communities): Focus on urban and rural differences in CE practices.
- Regional (Within Lodz Region): Address regional policies, resources, and initiatives.
- National and International (Broader Networks): Incorporate broader best practices and innovations from outside the region.

2. Demographic Segmentation

Objective: Tailor engagement strategies to different age groups:

- Youth (Under 25): Focus on educational programs and school-based initiatives.
- Adults (25-65): Target professionals and household decision-makers
- Seniors (65+): Address specific needs and leverage their community influence.

Professions:

- Students and Educators: Engage through academic programs and research projects.
- Industry Professionals: Focus on those working in agriculture, waste management, chemical industries, and energy.
- Government Officials: Involve in policy-making and regulatory frameworks.
- NGOs and Community Leaders: Leverage their networks for broader community engagement.

Experience levels:

- Beginners: Provide basic education and initial engagement opportunities.
- Intermediate: Offer more advanced training and involvement in pilot projects.
- Experts: Engage in leadership roles and co-creation of CE initiatives.

3. Psychographic Segmentation

Objective: Understand users' attitudes, motivations, and interests related to CE activities.

Motivations:

- Environmental Consciousness: Target those motivated by sustainability and environmental protection.
- Economic Benefits: Engage users interested in cost savings and economic opportunities.
- Community Involvement: Involve those motivated by community improvement and social impact.

Attitudes:

- Innovators: Early adopters willing to try new technologies and practices.
- Pragmatists: Those looking for practical, proven solutions.

- Sceptics: Users who need convincing through evidence and demonstrations.

Interests:

- Technology Enthusiasts: Engage through new technologies like 3D printing and digital tools.
- Hands-On Practitioners: Focus on practical activities like composting and waste segregation.
- Policy Advocates: Involve in regulatory and systemic solution development.

4. Behavioural Segmentation

Objective: Analyse users' interaction patterns, frequency of use, and engagement levels on the platform.

Interaction Patterns:

- Active Users: Regularly engage and participate in activities.
- Occasional Users: Engage sporadically and need periodic reminders.
- Inactive Users: Rarely engage and require reactivation strategies.

Engagement Levels:

- Explorers: New users exploring basic CE concepts.
- Connectors: Users with strong social networks promoting CE awareness.
- Enthusiasts: Deeply engaged in specific CE practices.
- Champions: Highly involved in both CE practices and community activities.

Frequency of engagement:

- Frequent Users: Engage frequently in activities and actions related to CE.
- Intermittent Users: Engage in activities occasionally.
- Infrequent Users: Rarely engage in activities.

Related cross-cutting and co-creating activities carried out within Frontsh1p:

The following activities align with the objectives of step 1 by enabling collection and analysis of user data that enables profiling of users and groups to inform engagement strategies. These activities foster diverse participation that allows for continuous feedback and reinforced community integration.

Meetings held

1. Name of Activity: Together towards circular economy!
Category: Meetings with local government units
Summary: On 24.02.2025, SŁOM organized a series of 8 meetings with member municipalities from the Łódź Metropolitan Area. These sessions introduced circular economy concepts, presented proposals for future initiatives, and analysed local needs and challenges. The small-group discussions fostered open dialogue on topics including waste management, sustainable public procurement, and monitoring, laying the groundwork for ongoing collaborative efforts.
Quantity: 8 meetings with local government units from the Łódź Metropolitan Area Community Engagement Initiative.
2. Name of activity: Pre-Education Information Meetings
Category: Meetings Held
Summary: A total of 3 information meetings were conducted prior to the education process in Parzeczew. These meetings involved city authorities, subordinate units, and stakeholders, and included collaborative decision-making on education and implementation directions. Foundational concepts such as circular economy, local currency, and social enterprises were introduced.
3. Name of Activity: WP4 Meeting Poland (March 9, 2023)
Category: Meetings Held
Summary: This meeting focused on the utilization of marginal lands in Poland, identifying local companies for vegetable oil extraction, and engaging local farmers for sustainable cropping systems.
4. Name of Activity: WP4 Meeting (October, 2022)
Category: Meetings Held
Summary: The discussion focused on the treatment of Organic Fraction of

Municipal Solid Waste (OFMSW), highlighting sustainable management practices such as composting and anaerobic digestion. Emphasis was placed on reducing environmental impact and maximizing resource recovery.

5. Name of Activity: Farmer Engagement Sessions (Various Dates)

Category: Meetings Held

Summary: Multiple sessions involved interacting with local farmers to plan the use of marginal lands, determine cultivation protocols, and secure cooperative agreements for sustainable crop production.

Methodologies Developed

1. Name of Activity: Development and testing of the "My Circular Household" self-assessment tool

Category: Methodologies Developed

Summary: A self-assessment questionnaire was created to evaluate the level of circularity in households, using a scale designed specifically for this project. It includes 21 questions covering emotional, cognitive, and behavioural components of attitudes toward circular economy practices.

target group: households in the local community

Main objective: Development of a questionnaire for the self- assessment of circularity in household and a key for the analysis of the level of circularity in the household

Results: A self-assessment questionnaire and key for the analysis of answers.

2. Name of Activity: Pilot testing of the self-assessment questionnaire

Category: Testing and Validation Activities

Summary: The tool was tested in four stages with various target groups: university researchers, local residents, government employees, and the school community.

Number of participants: 20

Main objective: pilot testing of a questionnaire to improve its easy of use, user-friendliness, clarity and diagnostic accuracy.

Results: A total of 20 questionnaires were completed, and feedback was used to refine the tool.

3. Name of Activity: Analysis of questionnaire results
Category: Data Analysis
Summary: The pilot study revealed key insights into household circularity behaviours, such as high levels of waste segregation, motivations for waste separation, attitudes toward food waste reduction, and common pro-ecological practices like energy-saving behaviours and reusing resources.
Number of participants: 61
Target group: Households in the local community
Main objective: Acquiring knowledge about the households' attitudes towards selected aspects of the circular economy in the local community in the Parzęczew commune.
Results: A total of 61 surveys were completed. Their results provide a basis for identifying areas requiring improvement and supporting actions and activities promoting circular economy.

Processes Created

1. Name of activity: Implementation of educational activity models
Category: Processes created
Summary: A comprehensive educational model was developed, focusing on children, local leaders, government representatives to enhance understanding of circular economy practices.
2. Name of Activity: Circular Spots in Local Government Offices
Category: Processes Created
Summary: Recommendations were outlined for accessible areas in public offices with waste segregation stations and educational materials to promote recycling and 6R principles among residents and employees.
3. Name of activity: Development of Workshop Scenarios for NGOs and Local Governments
Category: Processes Created
Summary: A workshop scenario titled "The Future of a Sustainable Organization" was developed to guide NGOs and local governments in implementing sustainable practices.
4. Name of Activity: Educational Activities and Practical Workshop Programs
Category: Processes Created

Summary: A structured replicable process was developed to engage local stakeholders through workshops on topics such as the waste management hierarchy, circular business models, product life cycles, and eco-design. This process includes engagement strategies for different groups (e.g., teachers, municipal councils, and informal associations) and emphasizes replicable practices to enhance circularity at local levels. The methodology also covers innovative activities, such as 3D printing for repair and upcycling.

Workshops

1. Name of Activity: Study Trip for Municipality Representatives

Category: Workshops/Meetings Held

Summary: A study trip to waste management facilities for municipal representatives and local leaders to learn about innovative practices and technologies for waste processing in Bzura (April 6, 2022). A study trip to the municipal waste management plant at Orli Staw took place in early April. It was attended by 24 participants from the University of Lodz, the Technical University, K-Flex and environmental officers from municipalities. The trip was a good opportunity to learn about the history and operation of the waste management system in the area where Orli Staw operates. Participants were able to see with their own eyes how the sorting plant, composting plant and landfill operate. Participants were also able to see how the second-hand material zone prepared for sale works.



PROGRAMME

Participation in a study trip

To the "Orli Staw" Municipal Waste Disposal

Plant

on 06 April 2022.

Departure:

06 April 2022, at 7⁰⁰ - Łowicz, car park behind the Town Hall, at 7³⁰ - Głowno, car park at the Lagoon, at 7⁵⁰ - Stryków, in front of the Town Hall - Stryków Municipality.

Study trip programme

7⁰⁰ - departure from Łowicz

10⁰⁰ - "Orli Staw" Municipal Waste Disposal Plant - study visit,

<https://www.orlistaw.pl>

13⁰⁰ - Lunch

14⁰⁰ - return to Łowicz (on the return journey the bus will stop in Stryków, Głowno and Łowicz).

Fig 3. Programme, Study Trip for Municipality Representatives. Source: Bzura

2. Name of activity: Training for Environmental Protection Staff
Category: Workshops Carried Out
Summary: Training sessions were organized for environmental protection staff in municipalities to enhance their qualifications and prepare them for adapting to the circular economy. These sessions focused on topics such as eco-design, waste management best practices, strategies for plastics, and innovative solutions for critical raw materials.
3. Name of activity: Training for Municipal Office Employees on Waste Management
Category: Workshops Carried Out
Summary: A training program was delivered to substantive employees of municipal offices focusing on waste management and circular economy strategies. Topics included maximizing raw material value, eco-design principles, and creating quality standards for secondary raw materials.
4. Name of activity: Training on "Sustainable Institution" for NGO Staff and Other Adults
Category: Workshops Carried Out
Summary: A training session titled "Sustainable Institution" was held on 22 March 2024 for NGO staff, representatives of organizational units, and other adults. The focus was on sustainability practices for institutions.
5. Name of activity: Training on Community Energy and Subsidy Programs for Local Officials
Category: Workshops Carried Out
Summary: A workshop on community energy, energy cooperatives, and subsidy programs for local officials in Parzeczew Commune was conducted in collaboration with the Parzeczew Commune Office and Polska Zielona Sieć Association. It took place on 28 April 2023 and covered affordable energy solutions.

Direct Actions by Stakeholders and Supportive Activities by External Entities.

The project embraces a nuanced strategy that integrates direct stakeholder actions with supportive external activities. These measures collectively promote enhanced awareness, education, and behavioural change, alongside targeted regulatory improvements to underscore practical implementation and ongoing adaptation towards the project's

Direct Actions by Stakeholders	Systemic and Regulatory Solution Development
Participation in pilot programs & initiatives directly linked to the CSSs goals	Foster collaborative decision-making for integration of CSSs into regional policies
Disseminate information about benefits of proposed solutions	Ensure that policies reflect the comprehensive integration of CSS initiatives
Active engagement	Drive legislative support for CSS initiatives, enhancing their adoption and effectiveness
Implementation of innovative technology & CE business models	Mobilise support for policies that facilitate the circular economy and the specific goals of each CSSs
Behaviour Modification Activities	Voluntary Actions by Private entities
Provide incentives for active participation	Encourage businesses to lead by example in the implementation of CSSs
Engage stakeholders in developing policies	Utilise digital tools to track and incentivize participation
Implement regulatory measures that support systemic integration, ensuring compliance and encouraging sustainable practices.	
Supportive activities by external parties	
Awareness & Knowledge activities	
Inspire broader adoption by highlighting best practices	

objectives. Table 6 outlines and contextualises the direct actions and activities that directly influence the implementation of Frontsh1p's CSSs.

Table 6. Actions and activities that influence CSS implementation. Source: *Own compilation

3.2 Step 2: Community identification and engagement

By systematically identifying, engaging, and selecting community members, the Frontsh1p project can build a robust network of stakeholders committed to implementing Circular Systemic Solutions in the Lodz Region. This approach leverages existing resources, explores new opportunities, and fosters sustained involvement, ensuring the successful transition to a circular economy.



Leveraging Existing Company Communities

- Objective: Utilise pre-established communities managed by partners.

Actions: -Engage Through Targeted Communication Campaigns: Develop communication materials (emails, newsletters, social media posts) tailored to the interests and needs of these communities. -Involvement Initiatives: Organise webinars, workshops, and discussion forums focused on specific Circular Systemic Solutions (CSS) to encourage active participation and knowledge sharing.

Employee Networks

- Objective: Utilise internal resources and networks of employees active in relevant communities.

Actions: -Conduct Internal Surveys: Identify employees involved in online communities related to the circular economy.-Leverage Employees' Connections: Encourage employees to introduce and promote the Frontsh1p project within these communities, potentially offering incentives for successful engagement.

Internet Search and Social Media

Objective: Identify new and existing circular economy-related communities.

Actions: -Use Search Engines and Social Media Platforms: Conduct searches using keywords related to circular economy, sustainability, and specific waste management practices.-Explore Platforms Like LinkedIn, Reddit, and Specialized Forums: Join relevant groups and forums to understand community dynamics and engagement levels.

Evaluation Criteria: Assess communities based on:

- Relevance: Alignment with the predefined goals.
- Engagement: Frequency and quality of interactions.
- Traffic: Number of active participants and overall community size.
- Active Participants: Identify key influencers and active contributors within these communities.

Community Engagement Strategies

Objective: Build relationships with identified communities for innovation involvement.

Actions:-Contact Community Administrators: Reach out to administrators to discuss potential collaboration and set clear expectations.-Consider Incentives for Participation: Offer incentives such as recognition, access to exclusive resources, or monetary rewards for active participation.-Manage Costs: Negotiate terms for community announcements and participation costs, focusing on performance-based pricing (e.g., actual number of participants) rather than impressions or clicks.

Screening and Selection

- Objective: Identify and select community members matching user indicators.

Actions: -Invite Community Members for Initial Tasks or Surveys: Use initial tasks or surveys to assess participants' traits, skills, and engagement levels. -Measure Traits and Skills: Evaluate responses to identify those with the necessary expertise and commitment. -Follow-Up: Re-engage experienced members for future tasks, building a core group of highly engaged and skilled participants.

Related cross-cutting and co-creating activities carried out within Frontsh1p:

Activities that fall within step 2 emphasize leveraging of existing communities through various initiatives for involvement. These activities foster engagement through communication, using the project channels as well as those from individual partners.

Meetings held

1. Name of activity: Educational Meeting on Water Conservation in Households
Date: 2024.11.13
Number of participants: 3 persons
Target group: Adults forming a micro-community around MAL L20
Summary: Raising awareness about water conservation in households, considering both ecological and economic aspects.
Main objectives: Raise awareness and identify strategies for water conservation, benefiting both the environment and household finances provided through practical methods to reduce water consumption and inform participants about the quality and sources of tap water in Łódź, and self-assessment of water usage habits.
Results: A diagnostic worksheet for evaluating water consumption, increased awareness of the environmental and financial impacts of water conservation, and greater knowledge about tap water quality to promote its use over bottled water. The activity fosters community discussions on collective water-saving actions and contributes to the development of a workshop scenario for a handbook.

Methodologies Developed

1. Name of Activity: Methodology for Circular Economy Workshops for Local Leaders, Councils, Teachers, and Residents
Category: Methodologies Developed
Summary: A comprehensive methodology was created for organizing circular economy workshops tailored to specific target groups, including municipal leaders, council members, teachers, and local associations. The methodology includes detailed workshop scenarios, educational programs, and practical tools such as lesson plans and didactic games. The workshops are designed to promote the circular economy, waste management, and eco-design principles across diverse community groups. The program also outlines activities for integrating circular practices into community spaces like MAL (Local Activity Place).

Processes created

1. Name of activity: Development of Workshop Scenarios
Category: Processes Created
Summary: Workshop scenarios were designed for primary schools, with a total of 2 scenarios developed: "Your Footprint in Nature" for grades 5–6, and "Ecocareer: Your Future in the Circular Economy" for grades 7–8.
2. Name of Activity: Agreements with Farmers
Category: Processes Created
Summary: Partner PARZECZEW initiated negotiations with the local farmers' association to implement activities for sustainable agricultural practices on marginal lands. These efforts aim to formalize agreements for land use, crop cultivation, and income generation, with a focus on avoiding competition with food and feed crops. Agreements were established between Novamont, farmers, and Parzeczew Municipality for the cultivation of crops on marginal lands. These agreements include reimbursement for farmers' fieldwork and the use of harvested seeds for oil extraction. A workshop is being developed collaboratively with NOVAMONT, Parzeczew Municipality, and agricultural associations. The

workshop will cover topics such as innovative agronomic practices, business models, income opportunities, logistics, and contractual models.

Workshops

1. Name of activity: Workshops on Circular Economy Topics

Category: Workshops Carried Out

Summary: A total of 8 workshops were conducted for different audiences on circular economy-related topics.

Dates:

- 19 April 2023: Workshop for students in Parzeczew and Chociszewo on CE and local currency.
- 26 July 2023: Workshop for members of the local newspaper *Młody Paris* in Parzeczew on CE actions.
- 6 February 2024: Workshop for Spatial Planning students at the University of Lodz on engaging residents in CE.
- 20 March 2024: Workshop for grade 5 students at Chociszewo Primary School on "Your Trace in Nature."
- 21 March 2024: Workshop for grade 8 students at Parzeczew Primary School on "Ecocareer: Your Future in the Circular Economy."
- 25 March 2024 (2 workshops): Workshops for grade 6A and grade 7B students at Parzeczew Primary School on environmental impact and CE career paths.
- 14 May 2024: Workshop for Spatial Planning students at the University of Lodz on engaging residents in CE.

2. Name of activity: Self-diagnosis workshop for OPUS on circular organisation

Category: Workshops carried out

Summary: OPUS created a workshop that can serve as a self-diagnosis for NGOs to analyse their services and operations in terms of circularity

Number of participants: 20

Target group: OPUS employees

Main objective: To diagnose OPUS by its employees in terms of how circular they are

Results: Workshop scenario

3. Name of activity: Workshops with students

Category: Workshops carried out

Summary: OPUS was invited to conduct workshops.

Number of participants: 30

Target group: Students from University of Lodz.

Main objective: To raise awareness and engagement of students into CE.

Results: 2 workshops.

4. Name of activity: Less Waste in the Kitchen Workshop

Date: 2024.10.11

Number of participants: 6 persons

Target group: Adults forming a micro-community around MAL L20

Summary: Educating participants on the philosophy and practical methods of the Less Waste lifestyle in the kitchen.

Main objectives: To increase ecological awareness regarding food waste utilization through practical skills to maximize food usage and promote alternatives to disposable kitchen products.

Results: Understanding of the Less Waste concept in the culinary context, promotion of pro-environmental attitudes and development of a workshop scenario for a handbook.

5. Name of activity: Educational Meeting on "Zero Waste" in the Context of Halloween

Date: 2024.10.25

Number of participants: 8 persons

Target group: Adults forming a micro-community around MAL L20

Summary: Educating participants on the philosophy and practices of the Zero Waste lifestyle while providing them with practical skills and tools to reduce waste in daily life. The workshop aims to increase ecological awareness, demonstrate the benefits of resource reuse, and encourage simple, sustainable habits that contribute to environmental protection and improved quality of life.

Main objectives: To raise ecological awareness, Teach practical skills for reusing and reducing waste (both organic and non-organic), and introduce alternative solutions such as reusable products instead of disposables.

Results: Understanding of the Less Waste concept in the culinary context,

promotion of pro-environmental attitudes, and development of a workshop scenario for a handbook.

6. Name of activity: Workshop on Rainwater Collection and Filtration

Date: 2024.11.18

Number of participants: 3 persons

Target group: Adults forming a micro-community around MAL L20

Summary: Teaching participants how to create a simple, homemade/survival water filter in the spirit of the Circular Economy. Developing skills in material reuse and creative problem-solving regarding resource management.

Main objectives: To raise awareness of how reducing the use of disposable resources can support environmental protection, introduce participants to Circular Economy principles and best practices, and explain how to prepare a simple water filter to purify rainwater for indoor plant watering. Assessment participants' knowledge about recycling and material reuse for informing participants about rainwater collection opportunities and available funding for such initiatives.

Results: Step-by-step instructions for creating a simple water filter, increased knowledge about rainwater collection and reuse. Discussion on funding options for rainwater collection systems and their potential applications in urban households in Łódź, strengthening the local community through sustainable water resource management initiatives.

7. Name of activity: Educational Meeting on "Zero Waste" in the Context of Halloween

Date: 2024.10.25

Number of participants: 8 persons

Target group: Adults forming a micro-community around MAL L20

Summary: Educating participants on the philosophy and practices of the Zero Waste lifestyle while providing them with practical skills and tools to reduce waste in daily life. The workshop aims to increase ecological awareness, demonstrate the benefits of resource reuse, and encourage simple, sustainable habits that contribute to environmental protection and improved quality of life.

Main objectives: To raise ecological awareness through practical skills for reusing and reducing waste (both organic and non-organic), and to introduce alternative solutions such as reusable products instead of disposables.

Results: Understanding of the Less Waste concept in the culinary context,

promotion of pro-environmental attitudes, and the development of a workshop scenario for a handbook.

8. Name of activity: Workshop on Rainwater Collection and Filtration

Date: 2024.11.18

Number of participants: 3 persons

Target group: Adults forming a micro-community around MAL L20

Summary: Teaching participants how to create a simple, homemade/survival water filter in the spirit of the Circular Economy. Developing skills in material reuse and creative problem-solving regarding resource management.

Main objectives: To raise awareness of how reducing the use of disposable resources can support environmental protection by introducing participants to Circular Economy principles and best practices. Activities explain how to prepare a simple water filter to purify rainwater for indoor plant watering. Assessment of participants' knowledge about recycling and material reuse, informing participants about rainwater collection opportunities and available funding for such initiatives.

Results: Step-by-step instructions for creating a simple water filter, increased knowledge about rainwater collection and reuse. Discussion on funding options for rainwater collection systems and their potential applications in urban households in Łódź, strengthening the local community through sustainable water resource management initiatives.

9. Name of activity: "Water Awareness: How to Minimize Daily Water Consumption"

Category: Workshop

Summary: Workshop on How to Reduce Water Consumption

Number of participants: 2

Target group: Citizens

Main objective: The goal of the workshop is to raise participants' awareness of water as a valuable natural resource and to teach them practical ways to reduce water consumption in households.

Results: Workshop Scenario

10. Name of activity: "Compost Bin: How to Minimize Food Waste in Everyday Life"

Category: Workshop

Summary: A workshop during which we will build a compost bin.

Number of participants: 3

Target group: Citizens

Main objective: The goal of the workshop is to raise participants' awareness of food waste and organic waste. It aims to provide guidance on what can be done with commonly wasted food, such as fruits and vegetables. The workshop is designed to inspire the adoption of eco-friendly attitudes and zero-waste habits.

Results: Workshop Scenario

11. Name of activity: "Passage of Roses in Your Home – Upcycling Workshops"

Category: Workshop

Summary: Creating decorative collage artworks from CDs in the spirit of upcycling.

Number of participants: 7

Target group: Citizens

Main objective: Raising awareness among participants that we have an impact on our environment by developing the right attitudes in everyday life. Highlighting the issue of plastic waste. Designing and ultimately creating collage artworks from CDs.

Results: Workshop Scenario

Information Campaigns

1. Name of activity: *St.Valentine's Day - Love for the Planet is loving your dear ones.*

Love is 6R - information campaign at Włókiennicza street in Lodz

Category: Information campaign

Number of participants: Unidentified

Target group: Passersby's

Main objective: To raise awareness and engagement of citizens into circular economy.

Results: 2 posters

2. Name of activity: SWAP ACTION

Category: Community Engagement Initiative

Summary: A one-day event held in Florentynów, organized by the Municipality of Parzęczew and the Florentynów Village Association "FUTURE," to promote waste

reduction and reuse. The event facilitated a free exchange of clean, undamaged items between residents, aiming to give objects a second life and reduce waste generation. Items included household goods, clothing accessories, toys, books, and small tools, while prohibited items included hazardous goods, food, electronics, and damaged items. Unclaimed items were sent to the Selective Waste Collection Point. The activity fostered community participation and raised awareness of sustainable consumption practices.

3. Name of activity: Wooden Planter from Euro Pallets

Date: 2024.08.06

Number of participants: 10 persons

Target group: Adults forming a micro-community around MAL L20¹

Summary: A practical introduction to the principles of the circular economy (CE) through the creation of a planter using recycled euro pallets, while incorporating the 6R principles.

Main objectives: To raise awareness of the role of material reuse in waste reduction, explaining how the 6R principles (Refuse, Reduce, Reuse, Refurbish, Repair, Recycle) apply in daily life and foster eco-friendly attitudes through creative engagement.

Results: Participants create a planter and gain knowledge about the Circular Economy principles. Promotion of pro-environmental attitudes through development of a workshop scenario for a handbook.

¹ MAL L20 - Miejsce Aktywności Lokalnej, ul. Legionów 20; Local Activity Place, Legionow 20 Street

3.3 Step 3: Virtual and physical interaction design

To create a stimulating and effective environment that engages circular economy stakeholders, the Frontsh1p project proposes a set of strategies that ensures that users are motivated, recognized and armed with the necessary tools.

Framework Concept

Objective: Create engaging and immersive activities to enhance user involvement.



Implementation:

- Real-Time Data Dashboards: Provide live data visualisation tools that allow users to monitor circular economy metrics.

- Simulation Tools: Develop interactive simulations to model circular economy scenarios and outcomes. -

- Gamified Challenges: Incorporate game-like elements such as points, badges, and leaderboards to motivate participation and sustained engagement.

Toolkit Approach

Objective: Empower circular economy stakeholders with customizable tools to innovate and test solutions.

Implementation:

- Customizable Toolkits: Offer a range of tools for tasks such as life cycle assessment, material flow analysis, and waste management optimization.

- Resource Libraries: Provide access to templates, guides, and best practice documents to support toolkit use.

Social Exchange Theory

Objective: Foster mutually rewarding interactions among users.

Implementation:

- Recognition Systems: Implement features that recognize user contributions, such as badges, certificates, and public acknowledgments.
- Exclusive Insights: Offer access to advanced research, industry reports, and expert webinars as rewards for active participation.

Tailored Interaction Design

User Motivations and Behaviours

Objective: Design interactions that align with the specific motivations and behaviours of circular economy stakeholders.

- Implementation:
- Personalized Content: Deliver content tailored to user interests and professional backgrounds.
 - Engagement Paths: Create different paths for exploration based on user expertise and goals.

Design Parameters

Objective: Facilitate various levels of interaction intensity and multimedia richness.

- Implementation:
- High-Intensity Interactions: Host live webinars, hackathons, and collaborative workshops.
 - Low-Intensity Interactions: Provide asynchronous forums, resource libraries, and recorded content.
 - Multimedia Content: Incorporate videos, infographics, and interactive elements to enrich the user experience.
 - Professional Communication Style: Maintain a tone that is professional yet approachable in all communications.

-Intrinsic and Extrinsic Incentives: Offer a mix of rewards, such as personal satisfaction from solving problems and tangible rewards like gift cards or professional recognition.

Tools and Platforms

Objective: Utilise advanced tools to facilitate concept testing, idea generation, and collaboration.

Implementation: -Virtual Concept Testing Environments: Create virtual labs where users can test their circular economy ideas.

-Idea Competitions: Organise contests to encourage innovative solutions to specific challenges.

-Collaborative Workspaces: Provide online spaces where users can work together on projects, share documents, and communicate in real-time.

Creating a Stimulating Environment

Realistic Judgement of Ideas

Objective: Ensure that ideas are evaluated fairly and constructively.

Implementation: -Peer Review Systems: Implement systems where users can review each other's work, providing constructive feedback.

-Expert Feedback: Involve industry experts to offer professional insights and validate ideas.

Community Functionality

Objective: Enable effective collaboration on complex problems.

Implementation: -Collaboration Tools: Provide tools for group discussions, shared project spaces, and document co-editing.

-Networking Opportunities: Facilitate connections between users through virtual meetups, discussion forums, and professional networking features.

Clear Regulations

Objective: Establish transparent guidelines to ensure smooth and secure interactions.

Implementation: -Legal Guidelines: Clearly outline rules regarding intellectual property rights, data privacy, and user conduct.

-Data Privacy Policies: Ensure users are informed about how their data will be used and protected.

-User Agreements: Require users to agree to terms of service that outline acceptable behaviour and responsibilities.

Related cross-cutting and co-creating activities carried out within Frontsh1p:

These activities carried out within the project align with the overall objective of Step 3 to design an interactive environment that not only informs but also actively involves participants in generating and testing ideas. Incorporating activities, such as those proposing new product ideas, is consistent with the design approach of the step.

Methodologies Developed

1. Name of activity: Development of a local currency model
Category: Methodologies developed
Summary: A model for introducing a local currency was developed, aimed at encouraging circular economy practices by providing economic incentives in collaboration with the local community.
Number of participants: approx.100
Target group: pupils from Primary school in Parzeczew
Main objective: Piloting phase of local currency model was conducted in school
Results: Model
2. Name of Activity: Communication - Use of Social Media, Articles and Broadcasting for Engagement
Category: Methodology Developed
Summary: A methodology for a targeted communication plan to disseminate information about circular economy initiatives and engage stakeholders at regional and local levels was created. This methodology leverages social media platforms (e.g., Facebook, Instagram, LinkedIn, YouTube) to share educational content, promote local environmental events, and foster a community interested

in circular economy topics. Recommendations such as radio broadcasts and published articles to increase public awareness of circular economy initiatives and inspire local action are advised in this methodology. Furthermore, engagement in partnerships with clusters and EU projects to promote learning, collaboration, and long-term circular economy goals is also advised.

3. Name of Activity: Competitions for Schools and residents

Category: Methodology Developed

Summary: A methodology for organizing art, photography, and article competitions for school students was created, focusing on waste reduction and circular economy themes. Competitions should encourage residents to develop recipes using leftovers and promote the idea of minimizing food waste.

4. Name of activity: E-learning Activities on Circular Economy

Category: Methodologies Developed

Summary: E-learning activities were created to educate various audiences about circular economy concepts, supporting flexible, remote access to CE education materials.

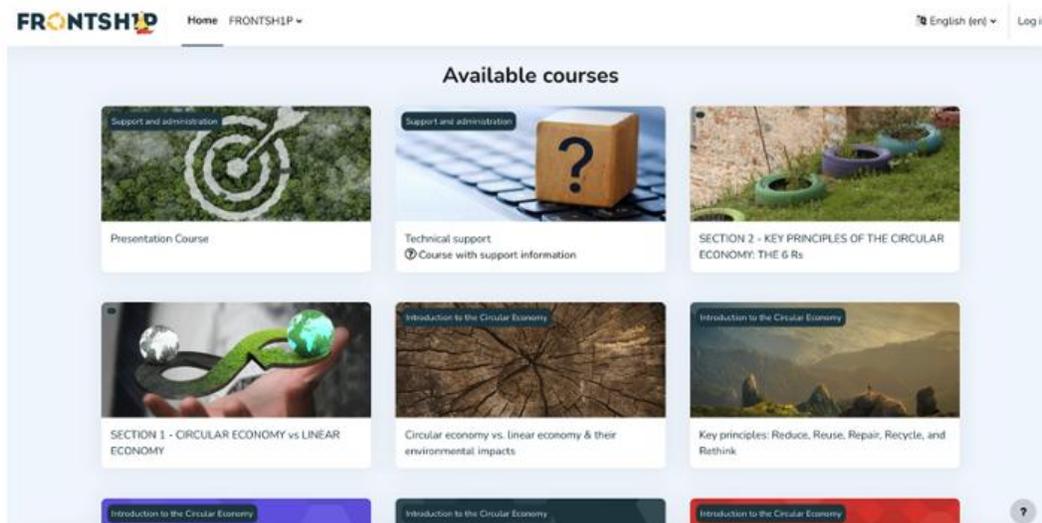


Figure 4. Frontsh1p E-learning platform homepage. Source: Frontsh1p

4. Name of activity: Creation of consultation and participatory mechanisms

Category: Methodologies developed

Summary: Mechanisms for community engagement were developed, including structured tools for consulting residents and involving them in decision-making and solution implementation for circular economy projects.

5. Name of activity: Development of the “Ladder of Participation” Model
Category: Methodologies developed
Summary: A participation model was created based on Arnstein and Hart’s "Ladder of Participation," modified to focus on engaging residents in the circular economy. The methodology outlined levels of involvement, from basic information dissemination to co-determination and cooperation. A structured model for local consultations, meetings and forums were organized to merge the "co-determination" and "cooperation" levels of the Ladder of Participation, fostering inclusive decision-making and joint project implementations. The model was developed to guide the participatory planning of circular economy activities with residents, focusing on key instruments like education, information, and inclusive initiatives.

Processes created

1. Name of activity: Establishment of a local microgrant program
Category: Processes created
Summary: A microgrant program was designed to support and enable residents to independently implement circular economy projects and strengthen their sustainable behaviour.
Target group: Związek Gmin BZURA
Main objective: The Education Programme of the Bzura Inter-Municipal Union was developed with the intention of integrating the inhabitants of the municipalities into advanced closed-loop economy (GOZ) practices through bottom-up initiatives and cross-sectoral cooperation. The programme responds to the pressing needs of local communities facing the challenges of increasing waste, lack of effective resource management mechanisms, and the need to adapt to sustainable practices. The pilot nature of the programme is part of the implementation of the model solutions developed under the Frontsh1p project, of which the Bzura Intercommunal Union is a partner.
Results: Programme assumptions for the Bzura Inter-Municipal Union, a publication describing the model
2. Name of Activity: Facebook Group "Życie w (o) biegu"
Category: Processes Created
Summary: A dedicated Facebook group was established to facilitate discussions,

share events, and promote circular economy practices among residents of Łódzkie. The group “Życie w (o) biegu” has 102 members. Women aged 35-44 are the most numerous and account for 28.7%. Among men, the same age group is the most numerous and accounts for 15.8 %. 60 posts were published on the group during the year, which amounts to 1.15 posts per week. All the information published on the group related to the circular economy and good practices in the Łódź Province promoting circular lifestyles. All content was viewed 1994 times and received 262 reactions. The most popular post was the one entitled: the second circulation is possible, which was displayed 52 times, followed by the proposal of a circular Valentine’s Day with 46 views.

Liczba osób, które wyświetliły posty: 1944 ⓘ

3 mar 2025

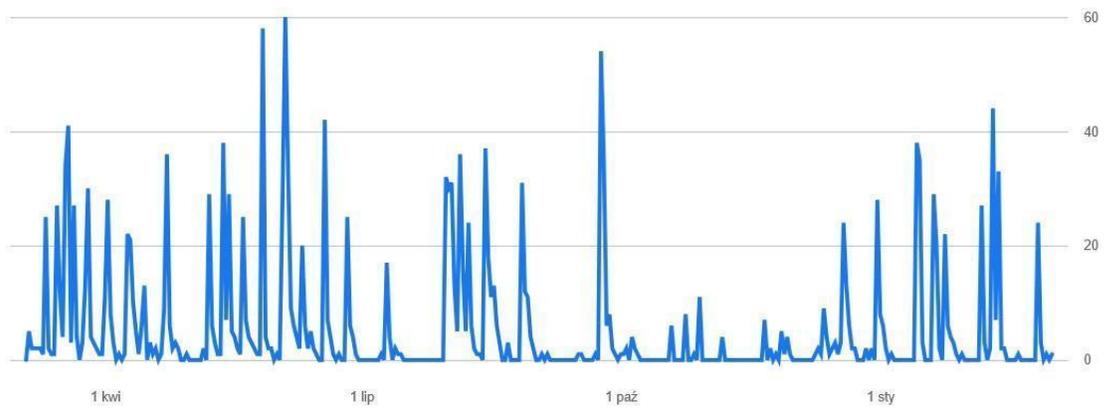


Fig 5. Facebook group insights, 3rd of March, 2025. Source: Facebook

3. Name of Activity: Promotion Through IT Tools- Eco Harmonogram Application
Category: Process Created

Summary: Implemented a mobile application to provide residents with waste collection schedules, air quality updates, and options for reusing items through a donate/exchange module. Utilized to streamline waste management communications and encourage sustainable practices among residents.

Workshops

1. Name of activity: Jewellery Making from Recycled Materials
Date: 2024.09.18
Number of participants: 4 persons

Target group: Adults forming a micro-community around MAL L20

Summary: A handicraft workshop utilizing plastic waste to create unique, eco-friendly jewellery. Raising awareness about the value of recycling and material reuse by crafting accessories from secondary raw materials.

Main objectives: To demonstrate that recycling can be a creative and fulfilling process by introducing participants to the concept of the CE and the possibilities of reusing waste and explain how to creatively and effectively transform plastic waste into useful objects. To conduct a hands-on workshop to teach techniques for working with plastic.

Results: Participants create earrings from plastic bottles. Participants become familiar with Circular Economy principles. Promotion of pro-environmental attitudes and development of a workshop scenario for a handbook.

2. Name of activity: Workshop on Creating Secret Compartments in Old Books

Date: 2025.02.04

Number of participants: 6 persons

Target group: Adults and youth, micro-community associated with the Library and Local Activity Center MAL L20.

Summary: A practical introduction for participants to the principles of CE through the creation of a hidden compartment using an old hardcover book from recycling, while incorporating the 6R principles. Promotion of the circular economy through the reuse and repurposing of old books.

Main objective: To raise awareness among participants about the environmental impact of excessive consumption and seasonal decoration production by introducing the concept of repurposing and other CE practices. Foster creativity through handicrafts and provide practical skills in DIY decoration making and reducing waste by reusing books that are no longer suitable for reading.

Results: Increased participant awareness of material reuse and their potential new applications. Development of manual skills and creative thinking in the zero-waste spirit. Preparation of a workshop scenario for inclusion in a handbook.

3. Valentine's Paper Ornament Workshop – Hanging Decoration

Date: 2025.02.11

Number of participants: 12 persons

Target group: Adults forming a micro-community around MAL L20

Summary: A practical introduction to the Circular Economy (CE) principles through

the creation of Valentine's heart-shaped hanging decorations from recycled old books, while incorporating the 6R principles.

Main objectives: Raise awareness of the environmental impact of excessive seasonal decoration production by introducing the concept of repurposing and other CE practices. Foster creativity and manual skills through handicrafts and reduction of waste by reusing books that are no longer suitable for reading.

Results: Practical application of CE principles (participants experience material reuse firsthand). Reduction of waste (Reuse): old, unwanted books were transformed into decorations instead of being discarded. Creative reuse (Reuse) by showcasing how everyday materials can be repurposed in new ways.

Behavioural change awareness with workshops highlighting the impact of small changes in consumer behaviour on sustainability. Community engagement through participant collaboration and exchange of ideas on sustainable crafts.

Development of a workshop scenario for a handbook.

4. Valentine's Paper Ornament Workshop – Garland

Date: 2025.02.13

Number of participants: 11 persons

Target group: Adults forming a micro-community around MAL L20

Summary: A practical introduction to the Circular Economy (CE) principles through the creation of a Valentine's garland from recycled old books, while incorporating the 6R principles.

Main objectives: To raise awareness of the environmental impact of excessive seasonal decoration consumption by introducing the concept of repurposing and other CE practices. Develop creativity through handicrafts and teach practical DIY decoration-making skills. Reduce waste by reusing books that are no longer suitable for reading.

Results: Increased knowledge about material reuse and its applications.

Development of manual skills and creative thinking in the zero-waste spirit.

Development of a workshop scenario for a handbook.

5. Name of activity: Discovering Zero Waste Plant-Based Cuisine

Category: workshop

Summary: Workshop on How to Cook While Following Zero Waste Principles and Reducing Organic Waste

Number of participants: 6

Target group: citizens

Main objective: Increasing ecological awareness. Learning practical skills for reusing and reducing kitchen waste

Developing skills related to cooking and utilizing ingredients

Results: Workshop Scenario

6. Name of activity: How to Make a Cat Scratching Post from Euro Pallets

Category: workshop

Summary: Workshop on How to Make a Scratching Post from Pallets

Number of participants: 5

Target group: citizens

Main objective: Awareness of Reusing Wooden Waste. Introduction to DIY

Techniques for Reusing Pallet Wood Boards

Results: Workshop Scenario

7. Name of activity: How to Make a Bird Feeder from a Plastic Bottle

Category: workshop

Summary: Workshop on reusing plastic bottles

Number of participants: 2

Target group: citizens

Main objective: Raising awareness of how to reuse a plastic bottle. Introduction to DIY techniques. Showing methods of having fun with children during craft workshops

Results: Workshop Scenario

8. Name of activity: Upcycled shelves made from pallets

Category: Workshop

Summary: Workshop on reusing euro pallets

Number of participants: 6

Target group: citizens

Main objective: An overview of the problem of wooden packaging waste, using disposable delivery pallets as an example. Using tools for woodworking and processing wood. Instruction on construction, design, and final assembly of wooden shelves.

Results: Workshop Scenario

9. Name of activity: "Decorative Plastic Baskets – Upcycling Workshop"

Category: workshop

Summary: Creating decorative containers/baskets in the spirit of upcycling.

Number of participants: 2

Target group: Citizens

Main objective: Raising awareness among participants that we impact our environment by developing the right attitudes in daily life. Introducing the issue of plastic waste. Designing and creating the final baskets.

10. Name of activity: "Zero Waste in the Kitchen – Sweet Vegan Treats"

Category: Workshop

Summary: Developing skills in plant-based cooking, including preparing vegan alternatives to traditional ingredients.

Number of participants: 8

Target group: citizens

Main objective: Promoting healthy and plant-based nutrition by teaching how to prepare sweet desserts without using animal-derived products. Raising participants' awareness about the benefits of zero waste in the kitchen, such as fully utilizing ingredients like aquafaba and chickpea leftovers.

Developing culinary skills related to preparing healthy vegan desserts.

Building ecological awareness by promoting the concept of a circular economy and minimizing food waste.

Results: Workshop Scenario

Information Campaigns

1. Name of activity: Green Wednesdays

Category: Information campaign on Facebook

Summary: Each Wednesday post about circular economy and pro-ecological solutions were posted.

Number of participants: Unidentified

Target group: Facebook followers

Main objective: To raise awareness and engagement of citizens into circular economy

Results: 32 posts

3.4 Step 4: User access and participation

By employing these strategies for user access and participation, the Frontsh1p project can effectively attract, support, and retain a diverse range of stakeholders.

This approach ensures that users are well-informed, supported, and motivated to contribute meaningfully to the project goals, fostering a sustainable and collaborative environment for the future uptake of the Circular Systemic Solutions in the Lodz Region and beyond.



Accessing Community Members

Objective: Inform and attract community members to participate in the Frontsh1p project through various communication channels and awareness stimuli.

Communication Channels:

Emails:

- Implementation: Send regular newsletters and updates to existing mailing lists, highlighting project opportunities and successes.
- Content: Include invitations to webinars, information about upcoming events, and success stories.

Banners and Pop-Ups:

- Implementation: Use website banners and pop-up messages on the Frontsh1p platform and partner websites to attract attention.
- Content: Promote new features, upcoming events, and key achievements in the project.

Articles:

- Implementation: Publish articles in relevant industry publications, blogs, and community newsletters.
- Content: Focus on the benefits of circular economy practices, project milestones, and calls to action.

Supporting User Participation

Objective: Ensure users receive adequate support and continuous feedback to maintain high levels of engagement and contribution.

Efficient Support Systems:

- Implementation: Set up a dedicated helpdesk with chat support, email support, and a comprehensive FAQ section.
- Responsiveness: Ensure quick and effective responses to user inquiries and issues.
- Training: Provide tutorials, guides, and webinars to help users navigate the platform and participate in activities.

Direct Feedback:

- Implementation: Establish channels for users to receive direct feedback on their contributions.
- Approach: Use personalised emails, platform notifications, and feedback sessions to communicate with users.

Monitoring and Feedback:

Continuous Analysis:

- Implementation: Use analytics tools to track user interactions, engagement levels, and contributions.
- Metrics: Monitor participation rates, activity frequency, and user retention.

Gather Feedback:

- Methods: Conduct surveys, polls, and feedback forms to gather user opinions and suggestions.

- Evaluation: Analyse feedback to identify areas for improvement and to recognize successful strategies.

Building Long-Term Relationships:

Objective: Develop and maintain lasting relationships with active contributors to foster a dedicated and collaborative community. First-Time Integration: Information Collection:

- Implementation: Gather data on user experiences during their initial engagement with the project.
- Methods: Use welcome surveys, onboarding feedback forms, and initial interaction tracking.
- Purpose: Understand user motivations, expectations, and initial challenges.

Long-Term Relationships:

- Implementation: Recognize and engage users who consistently contribute to the project.
- Methods: Offer exclusive access to advanced tools, early invitations to events, and recognition in newsletters and platform features.

Dedicated Community:

- Establishment: Create a dedicated community or forum for active contributors to facilitate ongoing collaboration.
- Activities: Organise regular virtual meetups, discussion groups, and collaborative projects to keep the community engaged.

Ongoing Collaboration:

- Sustained Engagement: Develop strategies to maintain user interest and participation over time, such as continuous learning opportunities and evolving project roles.

Related cross-cutting and co-creating activities carried out within Frontsh1p:

Activities related to step 4 emphasize facilitation of community engagement that ensures user participation is supported by feedback channels. They are activities that can support

long-term relationships built through careful collection of user experience data and recognition of contributors.

Meetings held

1. Name of activity: Action - Reaction: Clean Village Councils, Clean Community
Category: Community Engagement Initiative
Summary: A 10-day campaign organized by the Community of Parzęczew to involve residents, including children, youth, and local organizations, in cleaning up public areas across villages in the Parzęczew commune. The initiative aimed to promote pro-ecological behaviors, raise awareness of waste management, and encourage circular economy practices such as reusing and recycling. Coordinators from each village distributed materials, supervised activities, and organized waste collection points. The most involved village was awarded the title of "ECO-Village" based on participation and collected waste, with additional recognition for documented efforts. All participants received small gifts for their involvement.
2. Name of activity: 1 stage/period of Social Dialogue Council creation.
Summary: Animation meetings with potential stakeholders and representatives of the local government unit, local organizations, youth and entrepreneurs to: identify groups of stakeholders, initiate discussions about waste management and circular economy, education.
Number of participants: 10-20 in every meeting.
Target group: representatives of the local government unit, local organizations, youth and entrepreneurs
3. Name of activity: 2 stage/period of Social Dialogue Council creation
Summary: Analysis of municipal documents, formulation of assumptions, preparing different options and ideas about a Social Dialogue Council. It was an internal process to analyse legal basis and possibilities.

Methodologies Developed

1. Name of activity: Creation of information and Awareness campaign models
Category: Methodologies created
Summary: Models for information campaigns were developed to raise awareness about circular economy practices. These campaigns included general information,

waste-specific guidance, and promotion of the “circular household” and “circular commune” models.

2. Name of Activity: Eco-Friendly Promotional Materials

Category: Methodology Developed

Summary: A methodology was created for designed and distributed reusable items (e.g., thermal cups, eco-bags) and educational leaflets to encourage sustainable practices and reduce ecological footprint.

3. Name of activity: Creation of consultation and participatory mechanisms

Category: Methodologies developed

Summary: Mechanisms for community engagement were developed, including structured tools for consulting residents and involving them in decision-making and solution implementation for circular economy projects.

4. Name of activity: Establishment of a Social Dialogue Council (SPDC)

Category: Process Created

Summary: A Social Dialogue Council for circular economy was proposed in the Parzęczew commune. The process includes workshops, stakeholder engagement, and drafting operational regulations to involve residents and local organizations in policy-making.

5. Name of activity: Creation of Legal and Operational Frameworks for SPDC

Category: Methodology Developed

Summary: Legal and procedural documents, including an ordinance template and operational regulations, were drafted to formalize the SPDC's establishment and functioning.

6. Name of activity: Stakeholder Mapping Methodology for SPDC

Category: Methodology Developed

Summary: A structured approach was used to map stakeholders in thematic areas (e.g., plastic, food, wood). Participants ranked stakeholders' influence and interest, guiding decisions for future collaboration and council formation.

Process Created

1. Name of activity: Process for creating a Social Dialogue Council

Category: Process Created

Summary: Development of an optimal concept of a social council dialogue in Parzęczew, examining the legal basis for the establishment of a social council

dialogue, identifying possible forms of dialogue bodies, and preparing a workshop for stakeholders. Description and scenario are in the Rapport. There are also our conclusions and recommendations in that area.

Target group: citizens and municipality Parzęczew

Results: The list (map) of potential stakeholders of the council established, as well as the list of main issues, educational scenarios, workshops scenarios. Set documentation and development concept of establishing the Social Dialogue Council, preparing the scenario of workshops was carried out.

Dates: 6 meetings: 10.01.23, 01.02.23, 22.03.23, 28.04.23, 26.06.23, 26.07.23

Workshops

1. Name of activity: Stakeholder Engagement Workshops for SPDC
Category: Workshops Carried Out
Summary: Several workshops and meetings were held to animate stakeholder groups, introduce circular economy concepts, and identify key participants. Stakeholder mapping exercises helped classify entities by their interest and influence in waste management (e.g., plastic, bio-waste).
Quantity: 3 workshops (animation meetings, stakeholder mapping, and participatory governance discussions)
2. Name of activity: Open Space Workshop on Dialogue Body Structure for SPDC
Category: Workshop Carried Out
Summary: An open space workshop gathered input on forming the Social Dialogue Council. Discussions addressed governance structure, participant selection, and operational processes.
Quantity: 1 workshop (3 hours)
3. Name of activity: "Circular Economy as an Opportunity for the Development of Social Entrepreneurship" Webinar
Category: Workshops Carried Out
Summary: A webinar was organized to inspire current and future social entrepreneurs by showing examples of circular economy business models. It was focused on how circular economy practices can be integrated into social enterprises, with examples drawn from research and case studies, including those from P. Piechocki's analysis.

main objective: to inspire of other circular business models

Result: webinar and recording on the website (knowledge base)

Quantity: 1 webinar (March 26, 2024).

Target group: social entrepreneurs (Łódzkie voivod)

Number of participants: 5 (online)

4. Name of activity: Open Space Workshop on Social Dialog Council

Summary: workshops took place in Parzęczew, at 11.10.2023 (description is in the Report 7.1). An open space workshop gathered input on forming the Social Dialogue Council. Discussions addressed governance structure, participant selection, and operational processes.

Number of participants:12

Target group: Representatives of the local government unit, local organizations

Main objective: Develop the concept of an optimal form for the Social Dialogue Council in Parzęczew.

Results: there have been chosen the most possible variant of the Social Dialogue Council in Parzęczew, complete with documentation and recommendations.

4. Social Circular Business Model - Social Enterprise Models (Framework for the Creation of Local Social Enterprises)

4.1 Industrial symbiosis, job creation and regional replication potential

The development and implementation of CSSs within the Łódzkie region has required a strategic approach that integrates policy considerations, stakeholder engagement, and targeted interventions to foster regional replication and sustainable socio-economic development. All CSSs within Frontsh1p are interlinked, forming a robust network for data and material exchange that relies on mutual support to close the loop envisioned through the objectives of the project. A critical aspect of Frontsh1p is therefore associated with the synergies among the different CSSs.

Policy measures play a crucial role in the broad societal transformation needed by CSS implementation, by guiding expectations and promoting systemic change as it involves navigating complex challenges such as goal conflicts, coordination issues, and defining societal boundaries (Bergek et al. 2023), and to translate goals into action plans that drive both social and industrial transition. Many municipalities struggle to effectively collaborate with local businesses on waste management due to weak regulations and historically conflicting relations, which hampers progress towards social sustainability and broader circular economy goals (Dagilienè et al. 2021). National and regional strategies and policies are still often vague and offer little tangible implications in terms of social innovation and direction for the development of new business models regarding the CE transition (Wareeberg et al. 2024). In the traditional business model, collaboration typically occurs within the boundaries of a single organisation. However, for mutual benefits in a circular economy, cooperation among various stakeholders from both the public and private sectors is essential (Uusikartano et al. 2020). A circular business model in PPP infrastructure aims to reduce social and ecological costs while providing value to stakeholders. However, transitioning to circular PPP models requires the application of appropriate technologies, and adequate funding. (Akomea-Frimpong et al. 2023). Furthermore, territorial aspects, including accessibility, knowledge, and collaboration that enable synergies between industrial agglomerations, are crucial for the development and operationalization of a circular economy at various scales, as they provide the necessary resources, collaboration, and markets leading to synergy and industrial symbiosis (Tapia et al. 2021). Figure 5 highlights how a territory's inherent endowments (land-based resources, industrial agglomerations and transport/accessibility infrastructure) combine with its socio-technical capacities (technological expertise, knowledge and skills bases) and governance milieu (institutions, policies and relational networks) to shape its ability to attract, develop and sustain circular-economy activities. These spatially bound factors interact dynamically to determine a region's competitiveness, resilience and propensity for circular transformation.

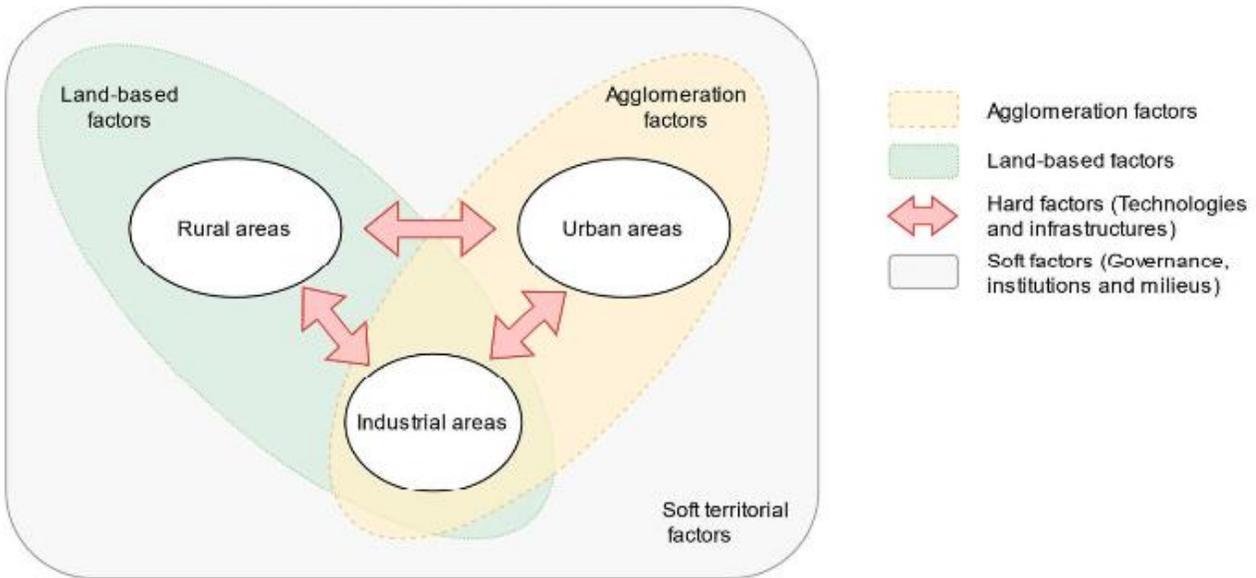


Figure 6. Territorial factors and their interactions in different types of territories. Source: Tapia et al. 2021.

At its core, Industrial Symbiosis involves the collaborative optimization of resources among different industries, aiming to reduce waste through shared services, utilities, and by-products. In the context of the Frontsh1p project, this collaboration is facilitated by the establishment of Circular Territorial Clusters (CTCs) and the implementation of the CircuPuncture methodology, designed to create the Circular Łódzkie Hub, which will highlight the significance of geographical and local conditions. A CTC represents a locally embedded economic network built upon added value chains between companies from various industries in the region. The successful functioning of a CTC depends on an entrepreneurial social ecosystem that integrates classical Helix models with active citizen participation. This integration aims to create a symbiotic relationship across economic sectors, enhancing both the replicability and scalability of circular practices in different regions. One integral aspect of Frontsh1p’s approach to create CTCs is associated with PPPs that manage monitoring activities within the CSSs. PPPs are deemed a suitable stakeholder configuration as they facilitate collaboration between government entities, the private sector, and society, thereby ensuring the effective implementation and oversight of CE initiatives. These are all enabling conditions for a potential Social Enterprise. The Circupuncture methodology (Frontsh1p, Kochańska. D2.2. 2023.) underpins this strategy by involving the creation, organisation, management, and improvement of CTCs through local booster projects. Additionally, the Łódzkie monitoring framework (Frontsh1p. Bosoni et al. D2.3. 2023) provides a comprehensive overview of

the circular economy's state within the region designed to identify key drivers for circular development and ensure alignment with local policy goals, thereby fostering coherence and synergy in the implementation of CE practices, to foster industrial symbiosis.

Societal and technological changes by the implementation of CE practices not only present challenges but also create opportunities for generating social benefits such as the generation of new jobs (Sulich et al. 2021). While CE literature predominantly views industrial symbiosis in terms of business model (Bocken et al 2014) the integration of Industrial Ecology and CE perspectives in Industrial Symbiosis design highlights their complementary roles: Industrial Ecology emphasises the iterative, context-driven collaboration essential for creating sustainable industrial networks, while CE focuses on the straightforward, business-oriented strategies that drive economic and environmental benefits, including job creation and resource efficiency (Baldassarre et al. 2019). Drawing from both Industrial Ecology and CE literature Faria et al. shows how industrial symbiosis in Brazil has significant societal implications in terms of job creation, and industrial innovation, which also enhance economic returns for local governments and communities (Faria et al. 2023). The implementation of industrial symbiosis in Prato's textile district, Italy, guided by circular economy principles, enhances job creation by fostering new business models in recycling and waste management, attracting investment, and revitalising underutilised industrial spaces. This collaboration between public authorities, enterprises, and the local community is observed to stimulate innovation and entrepreneurship, leading to increased sustainable practices and the generation of diverse employment opportunities within the local economy (Borsacchi et al. 2018). Furthermore, findings from Western Australia, shows how a proposed phosphogypsum decomposition industry, utilising precipitation reagents to produce new final products through industrial symbiosis significantly boost local employment generating numerous positions, including both skilled and semi-skilled labour and indirect job opportunities emerging from the supply chain (Mohammed et al. 2018). A biogas plant Sweden as an upcycling tenant through an Industrial Symbiosis network is foreseen to have the potential to significantly enhance environmental performance and socio-economic conditions, notably through wastewater nutrient recycling and plastic waste upcycling processes in the fishing sector. Over a decade, this network is projected to contribute substantially to job creation, supporting 200 jobs (2.5% of the local workforce) and generating significant economic revenues equivalent to 21.3% of the local GDP (Martin and Harris 2018).

4.2 Social circular Business Models

The increasing societal pressure to contribute positively to the community, combined with the necessity for financial sustainability, is a major driving force behind the rise of social enterprises. This dual objective of creating social impact while ensuring economic viability defines social enterprises and distinguishes them from non-profit organisations. These organisations embody a balance between economic characteristics such as continuous production, economic risk, and social elements such as societal benefits, inclusive governance, and limited profit distribution.

Social enterprises are situated in the middle of the spectrum, between social value orientation and financial value orientation. Their emergence is often linked to market or government failures. Despite growing interest, there is still no consensus on the precise definition of social enterprises, with at least 37 different definitions identified in academic literature. Common to these definitions are the activities that underpin them. For instance, in the United States, social enterprises are often market-based with a focus on income generation and social change, whereas in Europe, they are rooted in the cooperative tradition of the social collective system. (Neessen et al. 2021)

The creation of social value and the provision of solutions to specific social problems are at the core of social enterprises. There is also a perspective that views social enterprises as hybrid organisations, which combine social and/or environmental missions with economic value creation through market-based approaches (Saraç. 2021).

The European Commission defines social enterprises as organisations that primarily operate based on a social mission (impact first). They achieve their social impact as independent companies that provide services or products and have a revenue model (European Commission). In this context, profit is viewed as a means to an end, rather than an end in itself. Social enterprises are characterised by transparency, fair practices, and balanced stakeholder management and policies.

The European Commission adopted a new action plan on the social economy in December 2021 (European Commission. 2021). The aim of the action plan is to enhance social investment, support social economy actors and social enterprises to start-up,

scale-up, innovate and create jobs¹. To do so, the initiatives should cover the following three areas:

- creating the right framework conditions for the social economy to thrive
- opening up opportunities and support to capacity building
- enhancing recognition of the social economy and its potential

In the Frontsh1p project, social enterprises play a critical role in advancing circular systemic solutions. By integrating social and economic goals, these enterprises contribute to sustainable development and community well-being. They exemplify the project's commitment to creating systems that are economically viable and socially beneficial, reinforcing the principle that profit should serve the broader mission of societal and environmental impact.

4.3 KATCH_e methodology adapted to social enterprises

A circular business model canvas can greatly enhance the development of circular business models by providing a clear, visual framework that outlines how to integrate sustainability into every aspect of the business. By mapping key elements such as resource flows, value propositions, stakeholder relationships, and revenue streams, it enables organizations to identify opportunities for reducing waste, enhancing resource efficiency, and creating regenerative systems. This structured approach not only facilitates clearer internal and external communication but also supports more agile and informed decision-making as companies shift from linear to circular strategies. As noted by Bocken et al. (2016), employing strategic frameworks is essential in driving effective initiatives such as circular business models crucial for the circular transition.

The KATCH_e learning platform provides a comprehensive overview of the circular economy, emphasising its role as a sustainable alternative to the traditional linear economic model. The web-based platform explores challenges, strategies, and tools for implementing circular practices through the creation of circular business models (CBM). Besides a general overview of CE, the platform consists of modules and tools that

encompass subjects related to CBM such as Business, Design, and Assessment and Communication. The "CE Strategist" tool, part of the platform's business module, helps users identify circular business opportunities and develop a Circular Business Model Canvas (CBMC). Starting with a specific product and context, the tool guides users through evaluating circular strategies, and defining a business model using an adapted Business Model Canvas that considers CE principles (KATCH_e. Rocha et al. 2019).

As CBMs represent a shift from traditional linear models by focusing on sustainability through the efficient use of resources, the KATCH_e model is anchored in the broader concept of Sustainable Business Models (SBMs), which emphasise creating competitive advantages while contributing to societal and environmental well-being. The KATCH_e methodology is based on a "Value Hill" (Figure 6) to illustrate how value is created, maintained, and recovered throughout the lifecycle of a product or service in a CBM (Figure 6). This framework contrasts linear and circular models by depicting the trajectory of value creation and loss over time. The CE strategist tool used for generating the CBMC uses 11 predefined circular business strategies to evaluate which strategy fits best for a given context by providing a number of statements with the possibility of answers "True, Mostly true, Mostly false, False". (KATCH_e. Pamminer et al. 2019)

1. Uphill (Optimal Production and Design): This phase focuses on adding value through efficient production processes and design strategies. In a circular economy, this involves designing products for durability, repairability, and recyclability. Strategies such as circular sourcing (using renewable or recoverable materials), maximising production efficiency, and circular design (incorporating features for repair, upgrade, and recycling) are crucial in this phase. The aim is to reduce material waste and energy consumption during production.
2. Top-Hill (Optimal Use): During the use phase, value can be maintained and extended through services that enhance product longevity. This includes practices such as life extension services (providing maintenance and spare parts), product-oriented services (offering extended warranties or service contracts), and use-oriented services (leasing or sharing models). The focus here is on ensuring that products are used to their full potential and that their lifespan is maximised through various service-oriented approaches.

- Downhill (Value Recovery): In the post-use phase, the objective is to recover and retain value from products that have reached the end of life. This involves strategies for redistributing, refurbishing, remanufacturing, and recycling products or materials. The goal is to close the loop by reintroducing materials into the production cycle or finding new applications for them, thereby minimising waste and resource extraction.

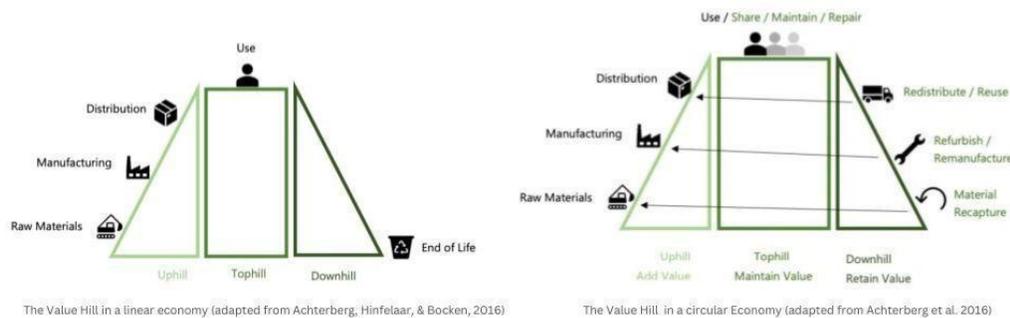


Figure 7. The Value Hill. Source: KATCH_e. Pamminger et al. 2019.

To develop a CMBC for a social enterprise, partners from all CSSs within Frontsh1p were asked to fill in the Strategist tool questionnaire. The current work presents results from CSS1 as an example, used for the development of an extensive CBMC case study (CSS2 available in Appendix). To emphasize the missing social dimensions of a social enterprise development, four statements were considered and added to the questionnaire, categorised under “Social value proposition” as shown in table 7. These statements include:

- The Business model is generating significant social benefits.**
This statement emphasizes the enterprise's commitment to identifying and improving its social impact.
- The Beneficiaries are also potential customers.**
This statement reflects the idea that a social enterprise can create a sustainable model by integrating its beneficiaries into the customer base, ensuring meaningful engagement by designing strategies.

3. **The Social benefits generated can be transformed into a value proposition for a specific group.**

This statement ensures that the business articulates its social impact as a competitive advantage.

4. **There are identified social needs to the communities where the business operates.**

This statement ensures that the business systematically identifies, engages, and collaborates with communities to remain relevant.

Business Model		Title: CSS 1: S1.3 Used Pallets to New furniture						
Description:		<p><i>For this task, UNIBZ decided to select and describe the business strategy developed by students during the Product Design course developed in collaboration with the Frontship project:</i></p> <p><i>Production of furnishing and accessories for small spaces, designed according to circular design principles, made with recycled wood from EPAL pallets. Functional, essential products, with attention to detail, durable, compact for shipping, easy to assemble, disassemble and repair (Images available in Appendix 2).</i></p>						
<p>Answer the following questions by evaluating the statements below and choose between the answer options false, mostly false, mostly true and true. If the question is not applicable to your evaluated product-system you can also choose to exclude the criteria from the evaluation.</p> <p>The questions aim to identify the best fitting Circular Economy Business Strategies by evaluating opportunities to capture value throughout the life cycle of a product. Much of the evaluation is based on the characteristics of a specific product. Therefore, choose one that is representative for the companies portfolio or do multiple evaluations with different product types.</p> <p>The questions cover the whole product life cycle, from the Uphill, Tophill- and Downhill-phase of product systems. Click on the Value Hill Icon to discover more.</p>								
Can you capture value by...		Uphill						
... choosing sustainable and recoverable materials for your product?								
Materials are mostly renewable and non-hazardous.		True						
Materials come from local sources, resulting in low transportation emissions.		Mostly true						
Materials are sourced under fair working conditions.		-----						
A high rate of recycles is used and the product itself is recyclable.		True						
The materials are highly eco-efficient, having few environmental impacts.		True						
The materials are easily separable. Composites and coatings are avoided wherever possible.		True						
... maximising the resource efficiency in the production process?								
The manufacturing stage is highly energy and resource intensive.		Mostly false			It depends on the quantities			

The production requires significant warehouse capacities.	Mostly false	It depends on the quantities	
The energy needed - power and heat - in the production process stems mostly from non-renewable sources.	False		
The production process results in a number of unused waste streams (heat, waste materials, water, etc.).	Mostly false	It depends on the quantities	
... anticipating after use scenarios in the design?			
Product parts with a short life time are easily accessible and separable.	True		
Products are easy to disassemble (with standard tools, in a short time, supported by a modularised design).	True		
Product failures are easy to identify and its design anticipates the most likely failures.	Not applicable		
Technical Obsolescence (e.g. due to short innovation cycles), if relevant at all, only relates to parts of the product.	Not applicable		
... providing long-life, high-quality products?			
Technical product innovation cycles are relatively long.	-----		
Technical product innovation cycles are relatively long.	Mostly false		
The product is timeless and/or customizable in its design.	Mostly true		
The use phase of the product is relevant in terms of its power consumption or use of consumables.	False		
Customers are willing to pay more for a eco-efficient, long-lifetime product.	Mostly true		

						Tophill			
... offering services that prolong the product life during the use phase?									
The product is characterised by parts with different lifetimes and/or requires consumables.	False								
The usetime of the product is shorter than its potential lifetime.	False								
Reasons for product failures are similar.	-----								
... adding services on top of sold products that prolongs their lifetime?									
Customers often hesitate to purchase the product due to uncertainties in the product performance.	Mostly false								
... retaining ownership of the products and renting them out?									
Customers don't need to own the product, but are interested in the functionality it provides.	Mostly false	It depends on the type of object/piece of furniture considered							
Products have a high residual value at the end of the use time.	Mostly true								
High purchase prices act as barrier for more customers.	True								
The average product use time is shorter than its lifetime.	Mostly false								
There is an incentive to take the products back after the use phase.	Mostly false								



Figure 8. Furnishing and accessories for small spaces made with recycled wood from EPAL pallets during Production
Design course: Source: UNIBZ

4.4 Frontsh1p Social Circular Business model

The added Social value proposition was mapped with the 4-step methodology to propose a guiding framework for activities and actions related to social aspects within a social enterprise, that are in line with the objectives of Frontsh1p. The following strategies should therefore be read as points of focus, complemented by the 4-step methodology:

The business model is generating significant social benefits...

1. Strategy: Social impact → Step 1: Determination of User Indicators (identification and engagement)

True: Social outcome report: Regular reports on social outcomes.

Mostly true: Social impact identification: Identification of areas for improving social impact and implementing targeted actions.

Mostly false/false: Social alignment revision: Revise activities to ensure alignment with social goals.

There are identified social needs in the communities where the business operates...

2. Strategy: Community engagement → Step 2: Community identification and engagement (systematically identifying, engaging, and selecting community members)

True: Community feedback: Maintain continuous community engagement to adapt to evolving needs.

Mostly true: Community identification: Deepen research to identify more specific or emerging needs.

Mostly false/false: Community engagement assessment: Invest in community engagement initiatives to better understand and serve the social context of the business.

The beneficiaries are also potential customers...

3. Strategy: Social design → Step 3: Virtual and physical interaction design (strategies that ensure users are motivated, recognized, and equipped with the necessary tools)

True: Social Engagement: Engagement strategies with social beneficiaries.

Mostly true: Social Targeting: Engagement on customer targeting and communication.

Mostly false/false: Needs and preference assessment: Product/service to include beneficiaries as customers by identifying their specific needs and preferences.

The social benefits generated can be transformed into a value proposition for a specific group...

4. Strategy: Social benefits assessment → Step 4: User access and participation (attract, support, and retain a diverse range of stakeholders)

True: Social Impact assessment: Make sure the value proposition is well-communicated to stakeholders, emphasising long term social impact.

Mostly true: Social benefits targeting: Fine-tune the messaging and refine the targeted group to better match the social benefits.

Mostly false/false: Social benefits framework: Rework how social benefits are framed within your business model, ensuring they are meaningful for the intended audience.

The strategies suggested by KATCH_e based on the answers provided in the questionnaire are reported below. Follow-up strategies were selected with the aim of illustrating a potential example of a possible Social Enterprise CBM.

Remanufacturing / Refurbishment

Restoration of a used product to a condition as good as new either, possibly also providing upgrades.

Value Hill Category: Downhill

Related Design Strategies: Design for remanufacturing

Evaluation: very high potential

Followed up on the Business Strategy? No

Reuse

Providing used products to new customers.

Value Hill Category: Downhill

Related Design Strategies: Design of long-life products

Evaluation: very high potential

Followed up on the Business Strategy? Yes

Use-oriented services

The ownership of the product remains with the service provider. It is made available in a different form and is sometimes shared by several users. Examples include leasing and renting (single user), sharing (sequential use by different users) and pooling (simultaneous use by various users).

Value Hill Category: Tophill

Related Design Strategies: Design of use- or result-oriented services

Evaluation: high potential

Followed up on the Business Strategy? No

Maximising Production Efficiency

Describes a few manufacturing principles that focus both on maximising the material and energy efficiency in the production process, such as Industrial Symbiosis, Low Carbon Manufacturing, Additive Manufacturing, On Demand Production, Dematerialisation, renewable energy, etc.

Value Hill Category: Uphill

Related Design Strategies: Design for energy sustainability, Design for materials sustainability

Evaluation: high potential

Followed up on the Business Strategy? No

Long Life Design

Focusing on delivering long-lasting and energy-efficient products the customers are attached to. Products are often comparatively expensive when acquired. Durability and Sustainability is a major part of the company's communication.

Value Hill Category: Uphill

Related Design Strategies: Design of long-life products

Evaluation: medium potential

Followed up on the Business Strategy? Yes

Product-oriented-services

Products are sold to consumers with extra services aiming to prolong the use phase of the product. Examples include extended warranties, service contracts, supply of consumables, take-back agreement, consultancy, etc.

Value Hill Category: Tophill

Related Design Strategies: Design for product-life extension

Evaluation: medium potential

Followed up on the Business Strategy? Yes

Result-oriented services

Clients and providers agree on a specific result and not necessarily a predetermined product. All resources used to deliver the result are becoming cost factors for the provider, creating a financial incentive to use them as efficiently as possible. Examples are highly individual and sector specific: activity management/outsourcing (e.g. Catering, Energy Contracting), pay-per service unit (e.g. pay per sheet in copying, pay per km in fleet management, pay per airplane landing, in tire management).

Value Hill Category: Tophill

Related Design Strategies: Design of use- or result-oriented services

Evaluation: low potential

Followed up on the Business Strategy? No

Circular Sourcing

Using resources as production inputs that are renewable, recoverable, bio-based, less resource intensive or recovering existing pollutants from the biosphere, such as ocean plastics. The strategy summarizes innovation approaches which focus on material choices such as Cradle to Cradle, Localisation, Biomimicry, Green Chemistry, etc.

Value Hill Category: Uphill

Related Design Strategies: Design for recycling, Design for remanufacturing

Evaluation: low potential

Followed up on the Business Strategy? Yes

Circular Design

Make use of product design strategies that are actively considering end of use strategies, such as repair, upgradability, modularity, repurposing, closed-loop recycling, etc.

Value Hill Category: Uphill

Related Design Strategies: Design for product-life extension, Design of product-oriented services

Evaluation: low potential

Followed up on the Business Strategy? No

Life Extension Services

Selling consumables, add-ons, spare parts or even upgrades which support the longevity of products and/or providing repair & maintenance services

Value Hill Category: Tophill

Related Design Strategies: Design of product-oriented services

Evaluation: low potential

Followed up on the Business Strategy? No

Material Recapture / Closed-Loop Recycling

Closed-Loop Recycling: Recapturing materials and components and/or transforming waste into new materials substituting the use of virgin materials

Value Hill Category: Downhill

Related Design Strategies: Design for recycling

Evaluation: low potential

Followed up on the Business Strategy? Yes

Based on the selected strategies, the KATCH_e model led to the CBMC in figure 5.

TITLE
CSS 1: S1.3 Used Pallets to New furniture_UNILODZ

DESIGNED BY CREATED ON ITERATION

For this task, UNIBZ decided to select and describe the business strategy developed by students during the Product Design course developed in collaboration with the FRONTSHIP project:

Production of furnishing and accessories for small spaces, designed according to circular design principles, made with recycled wood from EPAL pallets. Functional, essential products, with attention to detail, durable, compact for shipping, easy to assemble, disassemble and repair.

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
Circular Material Supplier e.g. Recycling facilities, Waste Management, Collection systems, Reprocessing Facilities, etc. CE Business Strategies - Circular Sourcing Notes No additional notes	Service Provision providing services which support the longevity of the product (support, maintenance, repair, etc.) CE Business Strategies - Product-oriented-services Notes No additional notes	Lower Lifetime Costs through longer uptime of the product, lower operating costs, higher eco-efficiency, providing secondary use cases, etc. CE Business Strategies - Long Life Design - Product-oriented-services - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes	Product Attachment Customers are attached to the products due to its high efficiency, value, premium branding, etc. CE Business Strategies - Long Life Design Notes No additional notes	New Customer Segments quality-conscious, green customers, cost-conscious, etc. CE Business Strategies - Circular Sourcing - Long Life Design - Product-oriented-services - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes
Reverse logistics product, component or material recovery provided by a third party (may also be executed in-house as a Key Activity) CE Business Strategies - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes	Design of long-life Products see also CE Designer CE Business Strategies - Long Life Design - Reuse Notes No additional notes	Sustainability providing an environmental and/or social benefit valued by customers and other stakeholders (e.g. Ecolabels, public procurement, etc.) CE Business Strategies - Circular Sourcing - Long Life Design - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes	Recurring Relationship through updates, maintenance, repair, addons, etc. CE Business Strategies - Product-oriented-services Notes No additional notes	Vertical Customer new customer segments outside the current value chain (Industrial Symbiosis, recipients of waste material streams etc.) CE Business Strategies - Material Recapture / Closed-Loop Recycling Notes No additional notes
Customer becomes a partner by initiating new valuable company processes such as takeback, repair, remanufacturing, etc. CE Business Strategies - Product-oriented-services - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes	Design of product-oriented services see also CE Designer CE Business Strategies - Product-oriented-services Notes No additional notes			
	Design for recycling see also CE Designer CE Business Strategies - Circular Sourcing - Material Recapture / Closed-Loop Recycling Notes No additional notes			
	Design for materials sustainability see also CE Designer CE Business Strategies - Circular Sourcing Notes No additional notes		Channels	
	Key Resources		Return Channel Offering a method to collect products after the use phase CE Business Strategies - Product-oriented-services - Reuse Notes No additional notes	
	Post Use-Phase Asset Management store, remanufacture, refurbish, upgrade and resell products after the use phase (warehouses, staff, shops) CE Business Strategies - Reuse Notes No additional notes		Re-Sale Channel Offering a secondary use channel, often distinct from the primary channel for new products CE Business Strategies - Reuse Notes No additional notes	
	Material Recovery Equipment, plants and staff for the material recovery processes, may be outsourced to a Key Partner CE Business Strategies - Material Recapture / Closed-Loop Recycling Notes No additional notes			



Cost Structure	Revenue Streams
Product Return Incentive Mechanisms such as deposits or credits are enforced to incentivise takeback schemes CE Business Strategies - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes	Product Sale Revenues changing sale revenues due to changed Value Proposition (e.g. price premiums for added value or longer life time) CE Business Strategies - Circular Sourcing - Long Life Design - Reuse Notes No additional notes
Labour Costs for providing labour-intensive services such as refurbishing CE Business Strategies - Long Life Design - Product-oriented-services - Material Recapture / Closed-Loop Recycling Notes No additional notes	Bundled Product Service Sale Revenues from the sale of customer-owned product-service bundles (with extended warranties, guarantees, takeback agreements, etc.) CE Business Strategies - Product-oriented-services Notes No additional notes
Manufacturing Costs due to changing materials, sources, quantities, processes, storing capacity, energy needs, etc. CE Business Strategies - Circular Sourcing Notes No additional notes	Waste as Value revenues from waste avoidance (e.g. through closed loops, longer life cycles, circular supplies, etc.) CE Business Strategies - Circular Sourcing - Reuse - Material Recapture / Closed-Loop Recycling Notes No additional notes
Transportation and Logistics service provision, additional transports, asset tracking, etc. CE Business Strategies - Reuse Notes No additional notes	

Figure 9. Circular Business Model Canvas for CSS1. Source: KATCH_e

In addition to these, the proposition for social enterprise strategies adds the following fields to the canvas:

Social impact
Determination of User Indicators (identification and engagement) Social outcome report: Regular reports on social outcomes.
Social design:
Virtual and physical interaction design (strategies that ensure users are motivated, recognized, and armed with the necessary tools). Social Engagement: Engagement strategies with social beneficiaries.

Social benefits assessment
<p>User access and participation (attract, support, and retain a diverse range of stakeholders).</p> <p>Social Impact assessment</p> <p>Make sure the value proposition is well-communicated to stakeholders, emphasising the social impact.</p>

Table 8. Social strategies for Circular Business Model Canvas, CSS1. Source: Own compilation

5. Linkage with the Łódzkie Monitoring Framework

5.1 Identified Social KPIs within the Monitoring framework

A comprehensive monitoring framework tailored to the Łódzkie region to measure progress in transitioning to CE was developed in D2.3 of the project. This framework is based on multiple pre-existing initiatives. Notably, the SCREEN project established a structured methodology for assessing circularity in projects which forms a foundation for the framework aligning with the expanded 2023 framework of the Ellen MacArthur Foundation (EMF), which emphasizes global sustainability and resilience. Developed through a bottom-up process involving consultations with stakeholders and 17 regional discussions, the SCREEN methodology produced a set of nine categories for KPIs. These serve as the foundation for the Łódzkie Circular Economy Monitoring Framework and are further adapted for each CSS by integrating specific objectives and actions.

To ensure practical application, the indicators are primarily categorized based on their geographical scale of impact:

- **Macro-level indicators** address broader national and global policies, covering areas such as trade, economic integration, and sustainable development strategies.
- **Meso-level indicators** focus on industry-level and regional dynamics, monitoring material flows and sectoral performance within an economy.



- **Micro-level indicators** assess more localized activities, such as business operations, urban systems, and product-level considerations, particularly in energy efficiency and waste management.

Additionally, the OECD inventory of CE indicators has contributed to the structuring of the monitoring framework, grouping indicators into five key domains: Governance + Education, Economic and business, Environment, Infrastructure and technology, and Society. These domains are further subdivided into various categories and distributed across 11 sectors, with numerous indicators classified under overarching circular economy themes.

While the Łódzkie monitoring framework provided robust insights, its indicators were designed primarily for regional oversight, focusing on territorial governance and large-scale circularity assessment. However, this approach does not fully address the operational needs of social enterprises, which require a more nuanced and business-oriented application of social KPIs. Social enterprises often operate at the micro-level, focusing on community-driven innovation, stakeholder engagement, and localized impact. Several indicators in the Łódzkie framework incorporate social aspects, demonstrating the recognition of societal benefits within the circular economy transition. Each CSS incorporates governance and education initiatives aimed at fostering local community involvement and skill development. Job creation and retention indicators in the Industrial Symbiosis category for example highlight the socioeconomic impacts within the CSS framework. For CSS1: Wood Packaging, indicators with social aspects include:

- Governance indicators such as “awareness campaigns to valorize wood waste” and “training courses on circular practices for wood sector workers.”
- Societal indicators such as “net balance of jobs” created through circular practices in the wood sector.
- Specific attention is given to training programs for workers and students, enhancing skills and promoting a circular economy culture in the region and retention linked to new industrial exchanges.

While the framework provided a robust foundation, certain gaps emerged in capturing the full breadth of social impacts. For example, community engagement was underrepresented, with limited indicators explicitly tracking the participation and feedback

of local populations. Similarly, while employment metrics were included, they did not address issues like job quality, inclusivity, or support for marginalized groups.

5.2 Reframing of CBMC for Monitoring Social Circular Enterprises

The following corresponding indicators were developed for the proposed strategies to monitoring activities related to the 4-step Methodology.

Step 1: Social impact

- Number of regular social outcome reports published annually. (Number/Year)
- Percentage of identified areas for social impact improvement addressed within a defined timeframe. (%/Year)
- Frequency of alignment revisions made to ensure activities meet social goals (quarterly, semi-annually). (Number/In relation to base year)

Step 2: Community engagement

- Number of community feedback loops completed annually (e.g. surveys, or focus groups). (Number/Year)
- Proportion of newly identified community needs integrated into business operations within a year. (%/Year)
- Investment as a percentage of revenue dedicated to community engagement and initiatives. (%/Year)

Step 3: Social design

- Engagement rate of beneficiaries through targeted communication strategies. (%/ In relation to beneficiaries)
- Alignment of Engagement Tools with Beneficiary Needs (%/ In relation to beneficiaries)
- Beneficiary Satisfaction with Engagement (%/Year)

Step 4: Social benefits assessment

- Percentage of stakeholders who recognize and value the communicated social impact. (%)

- Diversity index of stakeholders participating in social benefit initiatives (e.g., by demographics, regions, or sectors). (Number/Year)
- Number of community engagement initiatives implemented annually for long-term engagement with active contributors (Number/Year)

The following indicators were developed to support integration of social enterprises into regional industrial symbiosis networks operating in Łódzkie.

- Number of Social Enterprises Adopting Circular Business Models (Number)
- Industrial Symbiosis Partnership Rate of Social Enterprises (%)
- Circular Business Model Adoption Growth valorising material within the CSS (%/Year)
- Social Impact of Circular Initiatives (Composite Score)

5.3 Case study: Adapting Social KPIs to CSS1

Based on the answers provided in the CBMC, the following example can support its key adaptations within the monitoring framework. Serving as an example, it remains incomplete. However, it provides a baseline for future assessment and integration of potential Social Enterprises operating within the CSS:

Step 1: Social Impact:

- Indicator: Number of regular social outcome reports published annually.
 - Adaptation: Emphasis on activities that generate appropriate data and involve participation in drafting and reviewing strategies to highlight the social benefits of wood waste valorisation.
- Indicator: Percentage of identified areas for social impact improvement addressed.
 - Adaptation: Measures such as school programs, business training sessions, and community education programs focusing on practical actions like material recycling.

Step 2: Community Engagement:

- Indicator: Engagement rate of beneficiaries through targeted communication strategies.
 - Adaptation: Connect community members and local businesses with CE opportunities in the wood sector through for example workshops.
- Indicator: Number of community feedback loops completed annually.
 - Adaptation: Activities such as internal surveys to identify and map employee connections to relevant communities. Use initial tasks or surveys to assess participants' traits, skills, and engagement levels.

Step 3: Social Design:

- Indicator: Proportion of identified social needs integrated into business operations. (%)
 - Adaptation: Activities that fosters a direct dialogue with stakeholders, providing a platform for them to share insights that may suggest needed adaptations.
- Indicator: Beneficiary Satisfaction percentage with Engagement (%/Year)
 - Adaption: Beneficiary satisfaction score with virtual and physical interaction designs, as evidenced by feedback on activities and recognition systems.

Step 4: Social Benefits Assessment:

- Indicator: Percentage of stakeholders who recognize and value the communicated social impact.
 - Adaptation: Create targeted campaigns to demonstrate the benefits of wood waste valorisation, encouraging participation from local stakeholders.
- Indicator: Diversity index of stakeholders participating in social benefit initiatives.
 - Adaptation: Track demographic and professional diversity among participants in training and recycling programs.

To integrate the new indicators with the Łódzkie Monitoring Framework, categorization into the established categories had to be facilitated. This approach ensures that the stakeholder-driven challenges faced by the Social Enterprise are effectively incorporated into the broader regional and national targets of the project while maintaining methodological consistency. Table 9 exemplifies the process delineated in this chapter and includes all of the adapted KPIs.

CSS1							
Level	Category	Subcategory	Sector	Indicator	Unit	Year	Framework
Micro	Governance + Education	Monitoring and evaluation	Wood Packaging	Beneficiary satisfaction with engagement	%/year	n/a	CBMC
				Number of community feedback loops completed annually.	Number/year	n/a	CBMC
		Collaboration		Engagement rate of beneficiaries through targeted communication strategies.	%/In relation to beneficiaries	n/a	CBMC
		Stakeholder engagement		Percentage of stakeholders who recognize and value the communicated social impact.	%	n/a	CBMC
Micro	Economic and business	Added Value	Wood Packaging	Proportion of newly identified community needs integrated into business operations.	%	n/a	CBMC
		Business		Number of Social Enterprises Adopting Circular Business Models	Number	n/a	CBMC
				Circular Business Model Adoption Growth valorizing Wood Waste	%/Year	n/a	CBMC
Micro	Environment	Production and consumption	Wood Packaging	Industrial Symbiosis Partnership Rate of Social Enterprises	%	n/a	CBMC
Micro	Infrastructure and Technology	Area	Wood Packaging	Percentage of identified areas for social impact improvement addressed.	%	n/a	CBMC
Micro	Society	Jobs and human resources	Wood Packaging	Number of regular social outcome reports published annually.	Number	n/a	CBMC
				Diversity index of stakeholders participating in social benefit initiatives.	Number/year	n/a	CBMC
				Social Impact of Circular Initiatives	Composite score	n/a	CBMC

Table 9. Example of Circular Business Model Canvas indicators for Social Enterprise categorized within Łódzkie Monitoring Framework. Source: Own Compilation

6. Policy recommendations - Social innovation incubation program with replication potential - Linkage with Circupuncture Action Plan

6.1 Introduction - Social program for social enterprises

The increasing importance of social entrepreneurship arises from the recognition that governments, businesses, and academia often fail to fully address complex societal challenges, fostering sustainable social impact. To support the development and scaling of such enterprises, social incubators and accelerators have gained prominence as structured programs that provide essential resources, mentorship, and financial support.

Social incubators and accelerators differ in their objectives and methodologies. Social incubators primarily focus on early-stage ventures, guiding entrepreneurs through the definition of their business models and equipping them with foundational skills necessary for sustainability. In contrast, social accelerators target more mature social enterprises, facilitating their growth strategies and expanding their access to capital markets. Both forms of support structures contribute significantly to the ecosystem of social innovation by enabling enterprises to scale their impact effectively.

Casasnovas and Bruno (2013) define social incubators as programs designed to facilitate the scaling of organizations addressing social challenges through innovative and market-driven solutions. Their results, alongside studies by Sansone et al. (2020), highlights key components of social incubation, including training, mentorship, networking opportunities, and financial access. These elements collectively enhance the capacity of social enterprises to navigate the complexities of growth and impact measurement. Furthermore, regression analyses conducted by Pandey et al. (2017) indicate that social incubators perform on par with traditional business incubators in supporting tenant growth. This suggests that, despite their dual emphasis on social and economic objectives, social incubators are equally effective in driving enterprise success. Moreover, their role extends beyond individual enterprises to ecosystem-building, fostering collaborations that amplify the reach and sustainability of social innovation efforts.

Social innovation, as outlined by Eichler and Schwarz (2019), encompasses five core aspects: identifying social needs, incorporating innovative elements, ensuring effective implementation, achieving measurable improvements, and fostering collaborative relationships. Social incubators play a pivotal role in advancing these dimensions, acting as catalysts for systemic change. By nurturing social enterprises, they contribute to the broader landscape of sustainable development, aligning with global priorities such as the United Nations Sustainable Development Goals (SDGs).

6.2 Social Incubation program

To facilitate a Social Enterprise, robust ecosystem building with adequate support for their scaling and integration into broader CE strategies is required. Addressing these challenges requires the development of a multi-level policy approach that aligns legislative, financial, and institutional mechanisms with the needs of social enterprises operating within the circular value chains of Frontsh1p. Critical gaps such as weak regulatory frameworks, fragmented stakeholder engagement, and the need for effective cross-sector collaboration should form the basis for proposed policies.

Łódzkie's weaknesses are primarily to be found in improper legal regulations and immature cooperation. The weakness of legal regulations is due to their high variability, the lack of precision, which allows for a great deal of arbitrary interpretation. As far as cooperation in the Łódzkie Region is concerned, if it does occur, it tends to be of a traditional and forced, rather than being the result of a well-thought-out strategy based on the benefits of the ecosystem and symbiosis" (Frontsh1p. Przygodzki et al. D2.1. 2022). Barriers such as the difficulty in classifying waste as a valuable resource and immature cooperation, that has been identified in Łódzkie, can limit the dynamic development of innovative CE models, including those driven by social enterprises. As outlined in Deliverable 2.1 (Table 10), entrepreneurs from the Łódzkie Region have raised concerns regarding the current regulatory framework and its application, arguing that the legislative environment and its interpretation by public institutions create an uneven playing field where public entities receive preferential treatment, particularly in the way tenders are prepared and awarded, thereby disadvantaging private enterprises. They further highlight that the phenomenon of collusion among companies participating

in public procurements worsen market concentration by limiting competition to a few dominant players, with established market holders effectively lobbying to keep new entrants at bay. This environment of preferential treatment is aggravated by a prevailing culture of interdependent cooperation among businesses, which, rather than being altruistic, primarily revolves around the exchange of benefits and critical information. Such practices, together with the incompleteness of the market and information asymmetry, collectively hinder fair competition and market dynamism in the region. Furthermore, findings highlight a lack of awareness and difficulties in interpreting existing laws, along with regulatory uncertainties and complexity. Later assessments in Deliverable 7.5 have indicated that regions Bzura and Slom need enhanced circular procurement processes that foster synergies and standardize documentation across clusters, alongside targeted access to funding that supports R&D and systematically evaluates financial incentives (Frontsh1p. Ahlin et al. D7.5. 2024). Strengthening of circular society through robust partnerships, improved training programs, and comprehensive data systems will be essential for engaging local actors. Improved governance through harmonized public-private partnerships, unified legal frameworks, and standardized enforcement measures can minimize regulatory uncertainty and support sustainable practices, thereby creating a replicable model for advancing the circular economy regionally. These are factors that reinforce the need for targeted policy interventions that not only address broad CE challenges but also create supportive mechanisms for social enterprises.

Barrier's title

1. A system of fees[1] paid by citizens and property owners serves as the primary financing source for municipal waste management system within the local government unit;
2. Inadequate level of fees for municipal and industrial waste collection.

Recommendation -

changing the system of setting fees for collecting waste to clarify their rates and introducing an additional source of financing the waste management system in the form of introducing a system of fees paid by entrepreneurs for extended liability of the entrepreneur.

Insufficient functionality of the verifications system of implementation of the 10R rules¹ by municipalities, as entities managing the waste management system.

A. Far-reaching freedom in the reporting of obligations imposed on entrepreneurs collecting municipal waste from property owners;

B. Lack of sufficient instruments and financial means to control the fulfillment of the above-mentioned obligations by communes.

Recommendations:

A. Improve the functioning of the reporting system;

B. Equipping municipalities with appropriate control measures.

Application of public procurement rules to ensure that the municipality's waste collection business owners follow the competitiveness principle.

Recommendations:

Undertaking activities aimed at eliminating the monopoly of certain economic entities for the collection of municipal

Low uptake of equipment repair and reuse points at selective waste collection points.

Recommendations:

Introducing the legal obligation and not the possibility of municipalities to establish and maintain repair points and re-use of products or parts of non- waste products;

Table 10. Systematic approach to the legal barriers across the European and Polish legal system. Source: Frontsh1p, Policy Instruments and Incentives for Circular Economy. Source: Deliverable 2.1 - Final report 2020.

Social incubation programs represent a proven model for fostering the growth and scaling of social enterprises by providing comprehensive support such as training, mentoring, networking, and access to funding, that addresses both economic and social challenges. This model, such as evidenced by studies from Casasnovas and Bruno (2013) and Pandey et al. (2017), has demonstrated capacity to support organizations that merge market-oriented strategies with a scalable social mission to not only nurture

social innovation, but also to facilitate partnerships among stakeholders, that fosters industrial symbiosis. An incubation program framework, that would provide a structured environment to build, scale, and sustain social ventures addressing both environmental and social challenges could be presented as follows:

- **Target Audience:**

The incubation program targets early-stage social enterprises that are focused on areas such as waste reduction, sustainable resource management, renewable energy, or eco-design.

- **Comprehensive Support Services:**

- Customized workshops on developing circular business models, eco-design, navigating complex legal frameworks, and impact measurement.
- Guidance from industry experts and academia to help refine business strategies and overcome sector-specific challenges.
- Facilitated connections with local government agencies, academic institutions, and private sector partners to promote cross-sector collaboration and resource sharing.
- Support in preparing grant applications, connecting with impact investors, and accessing seed funding or preferential loans dedicated to circular economy initiatives.

This model offers a replicable framework that policymakers can adopt to allocate dedicated public funds and establish solutions to the current barriers within the region. The current incentive framework for CE implementation in Łódzkie (Table 11) is primarily designed to support a broad spectrum of actors through mechanisms such as grants, preferential loans, and regulatory mandates. Many of the measures, while universal in nature, already incorporate social dimensions that can serve as a foundation for nurturing social innovation. For instance, incentives like targeting food waste, such as food-sharing initiatives, social refrigerators, and food banks, are designed to address significant social issues like food insecurity and resource redistribution. Furthermore, the multistakeholder approach inherent in many of these incentive models can provide a good ecosystem for a social enterprise.

Identification of the incentive:			
CE Incentives category	Type of incentive	Detailed Solutions (actions/ legal standards / administrative rule)	Sender: level of government:
Educational	Raising the level of knowledge	Development and implementation of reward systems for CE knowledge (knowledge competitions, Olympiads, etc.), organized by individual local governments with funding from WFOSiGW of up to 90% of the cost (e.g., the "Second Life of Waste" competition funded by WFOSiGW in Lodz)	National /Regional /Local
		Promotional and information campaigns to raise awareness of CE (picnics, information materials e.g. information brochures, leaflets, educational videos issued by the Marshal's Office and by individual local governments), eco-education for children and schoolchildren organized by the WIOŚ	Regional /Local
		The provisions of the WPGO, which emphasize the need for environmental education on waste reduction	Regional
Social	Support the involvement of businesses and consumers and society as a whole in the CE.	Bottle machine system (e.g. Bottle machine in Manufaktura - collecting points exchanged for Manufaktura letters). Currently individual cases at the level of information only	Local
		Social initiatives: the Food Sharing Room	Local
		Publicity and information campaigns aim to consolidate CE-compliant behaviour, showing its social and individual benefits	Regional/Local
		Replacement of public trash garbage cans with those prompting waste segregation	Local
		Setting up containers for hazardous waste (batteries, fluorescent tubes, medicines)	Local
	Raise awareness of the opportunities that exist	Pro-environmental actions promoting behaviours consistent with CE goals (type: waste segregation) among various stakeholders (e.g., study visits, good examples, promotion of eco- shame)	National/ Regional /Local
		Shared residential responsibility for waste segregation - community control of each other	Local

	under CE and their benefits	Organization of competitions, such as: Stena Circular Economy Award - purpose: to promote companies that implement or promote the circular economy, to support students who have an idea to promote or implement CE to society or business (competition categories: Companies implementing CE, Companies promoting CE ideas, Students with an idea to promote or implement CE).	National
		Organization of forums, conferences, debates:, e.g.: on September 30, 2021, the 2nd Business and Sustainable Development Forum - Lodz 2021 was held	Regional
Market incentives	Support the creation of markets for secondary raw materials	Activities of the program support the so-called "repair cafes". Under the slogan NaprawiaMY with Veolia, the program has helped establish 16 cafes in Lodz. Repair cafes are initiatives to collectively and for free repair things that would be dumped for lack of a chance for a second life (this includes clothing, household appliances, furniture and bicycles)	Regional/ Local
		Functioning of repair shops at RIPOKs (Regional Installations for the Processing of Municipal Waste)	Regional/ Local

Table 11. Categories and types of CE incentives. Source: Frontsh1p, Policy Instruments and Incentives for Circular Economy, Deliverable 2.1- Final report 2020.

Findings on institutional cooperation in the Łódzkie Region reveals critical insights into the fragmented nature of current circular economy initiatives as the overall level of cross-sectoral collaboration remains low. In particular, community-driven projects are characterized by strong intra-sectoral integration but minimal interaction with other sectors, such as business and academia. This underscores a significant gap. While local communities are actively engaged in promoting sustainable behaviors, their efforts are largely isolated from the larger ecosystem that includes innovative business models. Social enterprises, with their dual focus on economic viability and social impact, could support bridging this gap. Furthermore, results demonstrate that projects aligned with local or regional development policies tend to achieve higher synergistic effects, which suggests that policies fostering integrated, cross-sectoral collaboration can significantly amplify the impact of CE measures. Hence, policy recommendations should not only address existing regulatory and financial barriers but also specifically incentivize partnerships that connect social enterprises with other companies and government bodies.

Successful circular social entrepreneurship requires underpinned reliable financing, innovative project strategies, and substantive collaboration among local governments

and various other parties within a supportive policy and infrastructure environment. Such an integrated framework enables new ventures to achieve scalable profitability, generate employment, and enhance circularity while delivering enduring social benefits (Frontsh1p. Laskowska et al. D7.1. 2024). Thus, the current incentives and policies could be further adapted by introducing tailored measures such as dedicated funding, simplified regulatory processes, and capacity-building initiatives that specifically recognize and support the hybrid mission of social enterprises. Policy recommendations should therefore include specific adaptations that enhance a support system for a social innovation incubation program, such as the one exemplified above, that would enable social enterprises to leverage existing incentives more effectively and serve as platforms for creating sustainable, cross-sectoral projects.

6.3 Roadmap to regional enhancement

To align mentioned objectives with the broader goals of the Frontsh1p project, and for enhanced replicability of project results, the current work suggested a path for the developed monitoring framework, to align with the Regional Roadmap, for enhanced replication.

The Circupuncture methodology is a resource-based framework designed to coordinate and advance circular transformation at the local territorial level. It provides a flexible and adaptive toolkit aimed at addressing the challenges of implementing a circular economy.

Key Features of the Circupuncture Methodology include:

- **Adaptive Implementation:**

The methodology recognizes that circular transformation clusters (CTCs) have flexible boundaries, allowing them to evolve and potentially expand their scope. This adaptability makes the approach highly relevant for dynamic regional ecosystems like the Łódzkie Region.

- **Bottom-Up Stakeholder Engagement:**

The methodology emphasizes participatory processes such as field discussions

and observational studies to identify challenges and design interventions to ensure strong local relevance and commitment.

- **Circular Challenges as Action Drivers:**

Instead of relying on conventional action planning, Circupuncture defines and prioritizes Circular Challenges (CC). These challenges act as "pins" that puncture specific circular economy issues and focus on key resource management stages (e.g., rethinking, reducing, recycling). Each challenge is linked to broader Resource Missions, ensuring alignment with sustainable development goals.

- **Integrated Support Mechanisms:**

The methodology integrates expert, financial, and technological support to promote entrepreneurship and community engagement in circular initiatives, such as waste management and educational programs.

- **Collaborative Implementation via Financial Patchworks:**

Activities under Circupuncture rely on a financial patchwork approach, where participating entities contribute resources or secure external funding. This collaborative financing structure is critical for sustaining long-term projects.

Within the Frontsh1p project, CCs are addressed by the CSSs. The Circupuncture Economy Action Plan operationalizes these principles, shifting from a top-down to a bottom-up approach. This shift necessitates adjustments in financing, operational territories, and ownership, ensuring that responsibility for implementation is distributed among multiple actors. Furthermore, a key aspect of the Action Plan is the role of the CTCs, which mobilizes stakeholders and coordinates implementation. The financing model reinforces a participatory nature through a financial patchwork mechanism. Each participating entity contributes resources or secures funding independently or collaboratively. Though the model may require frequent updates, it ensures stakeholder commitment and adaptability over time. Furthermore, the developed Action Plan's structure emphasizes precision for defining CCs that range from short-term efforts to long-term transformations, all within a defined operational horizon with implementation that relies on organically formed groups, with stakeholders identifying and committing to challenges based on their expertise and capacity.

Expected outcomes focus on converting territorial capital into circular capital, with indicators tracking progress. Regular assessments allow for iterative improvements,

ensuring the Plan remains responsive to evolving regional needs. In addition to the CCs developed for CSS1, the current work suggests the following two examples for proposed Circular Challenges to be aligned with the developed case study of the previous chapter. Challenges 2.7 and 3.4, facilitate this adapted Action Plan, considering the development of Social Enterprise within the Frontsh1p. While Challenge 3.4 directly concerns the CBMC methodology, Challenge 2.7 regards the objectives of the Social Incubation Program.

Challenge 2.7 Social Innovation Incubation Program for Social Enterprises	
Objective:	To foster the growth and scaling of early-stage social enterprises by creating a structured incubation program that delivers comprehensive support—including training, mentoring, networking, and access to funding—specifically targeting circular economy challenges and promoting sustainable, socially impactful business models.
Background:	<p>Social Incubation Programs have proven effective in nurturing ventures that blend market-oriented strategies with a scalable social mission. These programs help Social Enterprises overcome barriers such as navigating complex legal frameworks, refining business models, and accessing crucial financial resources. The incubation program is designed to:</p> <ul style="list-style-type: none"> ● Provide specialized training on circular business models, eco-design, legal navigation, and impact measurement. ● Facilitate mentorship from experienced industry experts and academic partners. ● Establish robust networking channels with local government agencies, academic institutions, and private sector stakeholders to enhance cross-sector collaboration. ● Improve access to funding, grants, and loans dedicated to circular economy initiatives.

General Scope:	<ol style="list-style-type: none"> 1. Deliver workshops and capacity-building sessions tailored to the needs of social enterprises in the circular economy sector. 2. Set up mentorship and advisory networks to guide venture development and overcome sector-specific challenges. 3. Create partnership platforms that connect social enterprises with key regional stakeholders for resource sharing and collaborative projects. 4. Assist in preparing grant applications and facilitate connections with impact investors.
Coordinator:	Regional Cluster Team (SPV)
Implementing Parties:	Local government agencies, academic institutions, private sector partners, and specialized incubator management organizations.
Timeframe:	January 2025 – December 2026
Financing:	Dedicated public funds, public–private partnership investments, and targeted tax incentives to support the establishment and ongoing operations of the incubation program.
Results	<ol style="list-style-type: none"> 1. Enhanced capacity and scalability of social enterprises addressing circular economy challenges. 2. Increased cross-sector collaboration and resource sharing among key stakeholders. 3. Improved success rates in securing funding and achieving measurable social and environmental impact. 4. Establishment of a replicable and sustainable model that can be scaled regionally.

<p>Indicators:</p>	<ol style="list-style-type: none"> 1. Success rate of incubated ventures in obtaining funding, grants, or loans. 2. Stakeholder satisfaction ratings regarding program support and collaboration. 3. Quantitative improvements in social and environmental impact metrics of participating ventures. 4. Percentage growth in venture scalability and operational performance.
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Table 12. Circular Challenge 2.7, Social Innovation Incubation Program for Social Enterprises. Source: Own Compilation.

<p>Challenge 3.3 Integrating Social Enterprise Models</p>	
<p>Objective:</p>	<p>To integrate social enterprises into the circular economy value chain of CTC, fostering community engagement, workforce inclusion, and equitable economic opportunities to contribute to circular practices that generate both environmental and social benefits.</p>
<p>Background:</p>	<p>Regulatory and market-based circular economy approaches often overlook the role of social enterprises in facilitating inclusive circularity. Integrating social enterprises can ensure that circular efforts generate jobs, address local social needs, and drive community participation in circular practices. This challenge aims to:</p> <ul style="list-style-type: none"> ● Enable social enterprises to operate in circular procurement schemes for materials, products and by-products. ● Ensure that marginalized groups have access to employment in circular processing initiatives. ● Establish a community engagement framework that connects local stakeholders with circularity efforts.

General Scope:	<ol style="list-style-type: none"> 5. Regularly monitor and report on social outcomes, identify areas for improvement, and adjust activities to better align with social goals. 6. Engagement of beneficiaries, tailored products and services to their needs, and gathering feedback to improve satisfaction. 7. Evaluation of social impact, ensure diverse stakeholder participation, and refine strategies to enhance the overall value. 8. Incorporation of community feedback to integrate emerging community needs into business practices, and allocate resources to support community initiatives.
Coordinator:	Regional Cluster Team (SPV)
Implementing Parties:	
Timeframe:	January 2025 – December 2026
Financing:	
Results	<ol style="list-style-type: none"> 5. Integration of feedback to keep business activities in sync with social and environmental goals. 6. Stakeholder input strategy adjustments to foster active community participation. 7. Strategic reinvestment in community initiatives to create a self-sustaining cycle for lasting social enterprise success.
Indicators:	<ol style="list-style-type: none"> 1. Number of Social Enterprises Adopting Circular Business Models 2. Industrial Symbiosis Partnership Rate of Social Enterprises 3. Circular Business Model Adoption Growth valorizing material within the CSS 4. Social Impact of Circular Initiatives

	<ol style="list-style-type: none"> 5. Number of regular social outcome reports published annually highlighting wood waste valorization 6. Percentage of identified areas for social impact improvement addressed. 7. Engagement rate of beneficiaries through targeted communication strategies about opportunities in the wood sector. 8. Beneficiary Satisfaction with Engagement. 9. Percentage of stakeholders who recognize and value the communicated social impact of wood waste valorization. 10. Diversity index of stakeholders participating in social benefit initiatives regarding wood waste.
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Table 13. Circular Challenge 3.3 Integrating Social Enterprise Models. Source: Own Compilation.

6.4 Strategic policy recommendations

Beyond the outlined solutions towards supporting circularity and social economy a wider, more long-term set of actions need to be considered, based on existing institutions and solutions tested in the region and beyond its borders. The three recommendations described below can be implemented independently of each other and in a different order, although it can be argued that their joint implementation will lead to maximising positive outcomes as it would lead to a wider stakeholder buy-in – for example experiences with sustainable tenders may lead to their better visibility in the local circularity strategy and vice versa.

Local government public procurement practices, support for circular networking coming from economic development agencies and creating strategic documents for local circular development could be steps involving entities we described in our document. They build upon existing good practices or documents, which in turn allows for knowledge exchange and minimising risks, e.g. through dialogue with companies, local authorities or think tanks involved in implementing suggested actions, e.g. through urban and regional networks and partnerships or university cooperation.

Recommendation 1: Aligning public procurement practices with social and environmental goals

Rationale: According to data presented by the Polish Public Procurement Office public procurement represents around 9% of the country's GDP and is worth ca. 275 billion Polish złoty (over 64 billion euro). It is therefore an important tool for stimulating local economies – the possibility to include green and social clauses within proceedings is used by local authorities, eg. Brzeziny authority in the Łódzkie region has been cited as one of the leaders in using public tenders to stimulate the growth of the social economy, along with creating their own social economy entity (Communal Service Social Cooperative) and using the in-house mechanism in tenders. Stimulating employment of people with disabilities was used – among others – in tenders related to municipal waste collection (a requirement for companies to have at least 50% of their workforce composed of people with disabilities). Experiences of Brzeziny were regularly showcased by the Public Procurement Office.

Next steps: Experiences of local governments in the region with sustainable public procurement (SPP) practices should be disseminated by a wide range of stakeholders, such as sustainability-oriented companies, NGOs, think tanks and scientific institutions in their regular work. Joint usage of both environmental and social clauses should be promoted as it could promote entities that build and shift their business models towards sustainability – and circularity practices. Knowledge gaps can be bridged by pointing toward the publication of the Polish Procurement Office on including circular economy practices in tenders, published in 2023, focusing on life cycle analysis and showing how to put forward circular tender requirements eg. for textiles, buildings, electronics or catering.

Desired results: Implementing this recommendation will give room to grow for social economy entities implementing circular economy practices. A snowball effect could be achieved if they – together with other stakeholders – engage in outreach action further promoting sustainable public procurement practices, with particular focus on simultaneous usage of environmental and social clauses. More supportive local governments would have an additional positive outcome as social economy entities would gather more funds that could be invested in their further development, leading to increased productivity and market competitiveness, making them attractive even in tenders without sustainability clauses, as well as for private companies looking for new partners in their value chains.

Recommendation 2: Stimulating industrial cooperation within Special Economic Zones

Rationale: Special Economic Zones were areas of preferential investment conditions that were meant to stimulate local economic development, mainly in areas suffering social and economic difficulties after the system change in Central Europe. While the exact regulatory and financial conditions changed (the most notable shifts included creating sub-zones in geographically distant areas or legal changes offering attractive conditions for investments across the country not limited to specific areas as previously) the initial effects of creating geographic proximity of companies along with dedicated tools for supporting their business activities can be used to promote circular economy practices.

Łódzka Specjalna Strefa Ekonomiczna – the entity presents in the economic life in the region – offers not only financial incentives towards partners (from deciding on tax breaks to offering support for companies hit by Brexit), but also accelerator programmes for start-ups, access to dedicated workshops and networking (Lodz Special Economic Zone, 2025) . A clear focus on supporting business innovations makes it a potentially useful tool of coordinating circular practices.

Next steps: The Special Economic Zone can introduce the topic of circularity in most of its non-financial support activities, such as workshops, talent acquisition and networking. This last possibility can be particularly useful as it may stimulate cooperation between companies, such as matchmaking with local circular and social economy partners that may cooperate with them in re-using products and materials from production processes. Such networking may involve either companies in close geographic proximity that are current partners of the zone, as well as via creating a dedicated programme of answering corporate needs with regards to circularity practices by offering potential partnerships with start-ups, existing SME companies or cooperatives.

Desired outcomes: Creation of an ecosystem of entities supporting circularity practices and translating circular economy theory into practice. A Special Economic Zone can become a hub for linking business challenges with possible market solutions, as well as with possible financial support towards joint projects, eg. EU funds.

Recommendation 3: Creating circular strategies for local/regional governments

Rationale: As crafting circular strategies is not an obligation for sub-national governments their creation is not seen as a top priority. It is also connected to the limited view of the circular economy as connected solely to waste management, strengthened by the fact that local authorities have the largest regulatory influence over this economic activity. In comparison other circularity practices are less developed, often limited in scope or offered by private entities as part of their CSR practices (eg. repair cafes).

In comparison a strategic answer to circularity challenges on the local level can become a tool guiding the implementation of other public policies, eg. with regards to environmental protection, economic development and social inclusion. While the most well-known example can be seen in Amsterdam similar documents were already developed in Central Europe, such as the case of Prague and Kraków (City of Amsterdam, 2025. InnoWo, 2023). Such documents may support taking concrete actions for managing material flows and maximising their value for the local economy, be it through utilising the potential of modular buildings, a wider use of rainwater, supporting urban agriculture or supporting local repair services.

Next steps: The aforementioned type of document can be created on different levels of local and regional management. Due to an important role of localized production and consumption for local development, limiting the carbon footprint and retaining economic value a region-wide strategy would be particularly useful, but city-wide or sub-regional (eg. metropolitan) documents can also be created. The latter approach may be particularly useful as it recognises the relationship between the urban and rural economies and allows for better spatial and organizational planning that is not tightly limited by administrative boundaries.

Desired outcomes: A set of practical documents creating a cohesive framework of action along with priority goals and tools to measure progress. Crafting such materials offers another opportunity for networking, market mapping and knowledge exchange that may also include social economy entities. A participatory approach may lead to better understanding of potential opportunities stemming from circularity, as well as a sense of ownership over the issue, making it more approachable for stakeholders and the documents themselves better reflecting local contexts – for example the strategy for Kraków takes into account different backgrounds and development pathways of the city’s districts, while the city of Prague sees the role of social enterprises in running spaces such as reuse points or furniture banks.

7. Conclusion.

This deliverable has set forth a framework for social circular enterprise business models that aims to drive both environmental sustainability and social inclusion. By systematically determining user indicators, identifying and engaging key community segments, user access, participation and interaction design, and highlighting industrial symbiosis through robust stakeholder collaborations, the deliverable has demonstrated how co-creation activities can serve as the foundation for developing these local social enterprises. These enterprises not only offer innovative solutions to social challenges but also contribute to sustainable regional growth, bridging gaps in current CTCs operating within the project.

The proposed framework and examples present suggestions for replicable models that can support the creation of new job opportunities, and encourage active participation from local authorities, NGOs, and private sector partners. Moreover, the strategic roadmap and policy recommendations with linkage to the Circupuncture Economy Action Plan provide guidance for scaling these initiatives and integrating them within broader regional enhancement strategies of Frontsh1p with the potential for replication.

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KATCH-E Strategist tool, Questionnaire answered CSS2

	 KATCH_e - Knowledge Alliance on Product-Service Development towards Circular Economy and Sustainability in Higher Education							
Business Model	Title:	CSS2: S2.2 Bioplastics for OFMSW collection						
Description:	Production of biobased building blocks (diols and dicarboxylic acids) from second generation feedstock (from regional agro-industrial waste rich in sugars) for the formulation of new compostable bioplastics suitable to be used for production of compostable bags for OFMSW collection.							
<p>Answer the following questions by evaluating the statements below and choose between the answer options false, mostly false, mostly true and true. If the question is not applicable to your evaluated product-system you can also choose to exclude the criteria from the evaluation.</p> <p>The questions aim to identify the best fitting Circular Economy Business Strategies by evaluating opportunities to capture value throughout the life cycle of a product. Much of the evaluation is based on the characteristics of a specific product. Therefore, choose one that is representative for the companies portfolio or do multiple evaluations with different product types.</p> <p>The questions cover the whole product life cycle, from the Uphill, Tophill- and Downhill-phase of product systems. Click on the Value Hill Icon to discover more.</p>								
Can you capture value by... Uphill								
... choosing sustainable and recoverable materials for your product?								
Materials are mostly renewable and non-hazardous.						True		
Materials come from local sources, resulting in low transportation emissions.						Mostly true		
Materials are sourced under fair working conditions.						True		
A high rate of recyclates is used and the product itself is recyclable.						Mostly true		
The materials are highly eco-efficient, having few environmental impacts.						Mostly true		
The materials are easily separable. Composites and coatings are avoided wherever possible.						Not applicable		
... maximising the resource efficiency in the production process?								
The manufacturing stage is highly energy and resource intensive.						Mostly false		
The production requires significant warehouse capacities.						Mostly false		
The energy needed - power and heat - in the production process stems mostly from non-renewable sources.						Mostly false		

The production process results in a number of unused waste streams (heat, waste materials, water, etc.).	False		
... anticipating after use scenarios in the design?			
Product parts with a short life time are easily accessible and separable.	Not applicable		
Products are easy to disassemble (with standard tools, in a short time, supported by a modularised design).	Not applicable		
Product failures are easy to identify and its design anticipates the most likely failures.	True		
Technical Obsolescence (e.g. due to short innovation cycles), if relevant at all, only relates to parts of the product.	True		
... providing long-life, high-quality products?			
Technical product innovation cycles are relatively long.	Mostly false		
Technical product innovation cycles are relatively long.	Mostly false		
The product is timeless and/or customizable in its design.	Mostly true		
The use phase of the product is relevant in terms of its power consumption or use of consumables.	Mostly false		
Customers are willing to pay more for a eco-efficient, long-lifetime product.	Not applicable		

						Tophill		
... offering services that prolong the product life during the use phase?								
The product is characterised by parts with different lifetimes and/or requires consumables.	False							
The usetime of the product is shorter than its potential lifetime.	False							
Reasons for product failures are similar.	Not applicable							
... adding services on top of sold products that prolongs their lifetime?								
Customers often hesitate to purchase the product due to uncertainties in the product performance.	Mostly false							
... retaining ownership of the products and renting them out?								
Customers don't need to own the product, but are interested in the functionality it provides.	Mostly true							
Products have a high residual value at the end of the use time.	True							
High purchase prices act as barrier for more customers.	Mostly false							
The average product use time is shorter than its lifetime.	True							
There is an incentive to take the products back after the use phase.	Not applicable							



... offering only the functionality that users seek as a service?								
Customers mainly seek the functionality not the ownership of the product (e.g. mobility instead of car ownership)						Not applicable		
Products often underperform in their use phase in relation to their potential (e.g. due to limited user expertise)						False		
Products are characterised by high investment (purchase prices) and/or operational costs.						Mostly false		
Customer requirements are highly individual.						Mostly false		
					Downhill			
... remarketing used products?								
Products are often still functional at the end of their use time.						True		
There is a high customer demand for used products (e.g. due to lower prices).						Not applicable		
... remarketing upgraded / remanufactured / refurbished products?								
Products are often still functional at the end of their use time.						Mostly true		
There is a high customer demand for used products (e.g. due to lower prices).						Mostly false		
... recapturing materials from discarded products?								
High material costs are associated with the production of the product.						Mostly false		
Large amounts of discarded material are available as potential a secondary source.						Mostly false		
... Social value proposition								
The business model is generating significant social benefits.						-True		
The beneficiaries are also potential customers.						-True		
The social benefits generated can be transformed into a value proposition for a specific group.						-True		
There are identified social needs to the communities where the business operates.						-True		

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