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Alpine Space
Cradle-ALP

Chemie Cluster Bayern

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D.2.1.2

Transnational sectoral working groups (TSWG)

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Activity n°:	**2.1**
TSWG:	Wood/Furniture
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1. Introduction to Cradle-ALP project

Cradle-ALP aims for mainstreaming cradle to cradle (C2C) approaches, circular design and circular substitutions (from the alpine region) for linear products in industrial processes, in different industrial sectors. The Alpine Space has many natural resources and the technologies to substitute fossil raw materials and toxic substances from production with circular and environmentally friendly alternatives. This should lead to the fact that materials and products can be led back into a healthy cycle after use. The focus of this project shall be on the substitution of chemical and fossil based/unsustainable materials with more circular, sustainable and bio-degradable ones.

First, the partners will build a broad awareness and understanding in the public, the relevant industries as well as among stakeholders from policy and innovation intermediaries, for the opportunities, barriers and mechanisms of the transformation of industrial products towards higher circularity by means of C2C approaches, circular design and circular substitutions. Business support providers shall be trained to accompany the transformation of businesses along more circular value chains.

In a second step, the partners will explore in details and test opportunities for implementing C2C approaches, circular design and circular substitutions along specific value chains in the chemistry/plastics and wood/forestry sectors supported by digital technologies. Building on a thorough multidimensional (technology, policy, economy, etc.) roadmapping exercise, transnational groupings of stakeholders – including businesses – will be installed, with the aim to transfer the C2C roadmaps into industrial practice along exemplary value chains.

Finally, the partners will work towards ensuring a transnational policy convergence towards transnational S4 strategies in the priority sectors of the project and initiate common cross border funding instruments for the industrial C2C transformation.

2. Objectives and scope of the sectoral Cradle2Cradle industrial transformation roadmaps

By the end of period 2 (April 2024) the Cradle-ALP partners will elaborate **5 circular transformation roadmaps** for the 5 industrial sectors identified as key sectors for the Alpine space:

- Chemistry/Materials
- Polymers/Composites
- Packaging
- Textiles/Fibres
- Wood/Furniture

The roadmap methodology was prepared by Chemic Cluster Bayern, leader of WP2 **Roadmaps to Cradle2Cradle transformation**, and Polymeris, leader of Activity 2.1 **Develop sectoral Cradle2Cradle industrial transformation roadmaps in five selected sectors**, with the support of all Cradle-ALP partners.

Roadmapping is a process that generates information on the status of products and technologies in an innovation context at a specific point in time and on the type, speed and

direction of possible research and technology developments, aggregating possible challenges and translating them into activities, requirements and milestones. The goal of the Cradle-ALP Transformation roadmaps is to have a structured guidance on how to foster the transformation of industrial practices towards circularity & cradle-to-cradle approaches in the 5 key industrial sectors for the Alpine Space.

The first step of the Cradle-ALP roadmapping process was to define a vision that aligns the stakeholders from each of the 5 industrial sectors (businesses, public authorities, academics etc.) on a joint understanding of what is the ideal scenario for the future in their industrial sector, in a given time-frame. It refers to a clear and inspirational description of the future state that an industry aims to achieve in order to become more circular.

To do so, the partners first worked on analyzing their industrial sector ecosystem in the Alpine Space region with respect to circular economy in general and the cradle to cradle principles in particular. Based on the information collected by each partner within its region, the TSWG leader elaborated a sectoral ecosystem analysis that was then presented to the experts during the expert's workshops in order to engage discussion and collect input and recommendation (for more information see D2.1.1). Experts from each sector gave input and recommendation on the ecosystem analysis but also on the definition of an overall and realistic goal that the Cradle-ALP partners could set for each of the 5 transformation roadmaps.

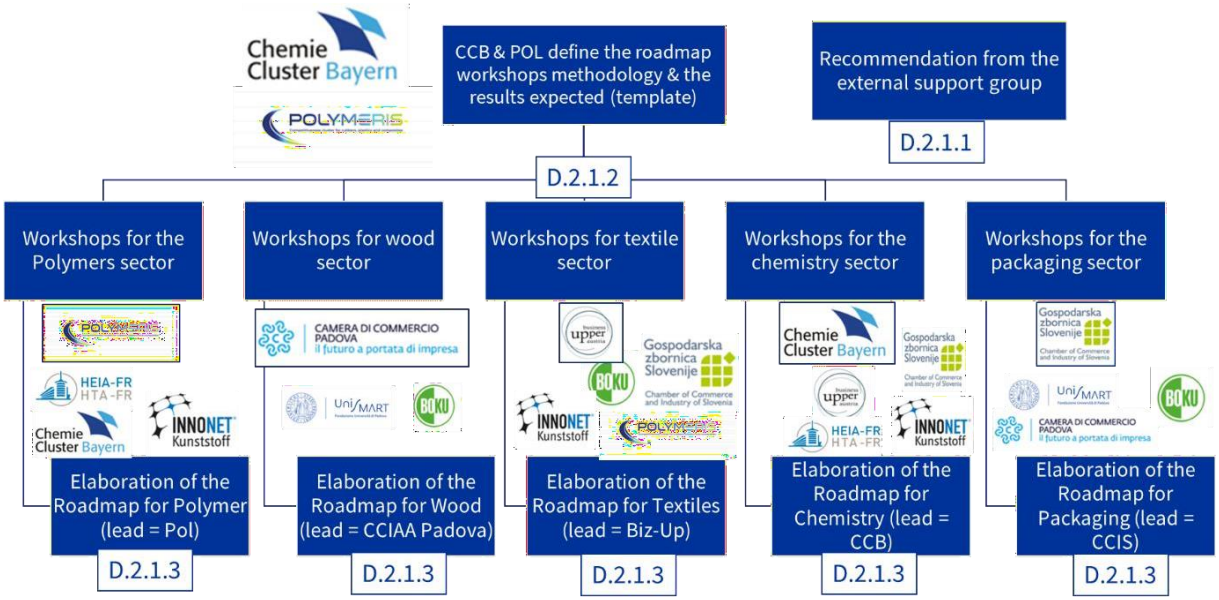
Following the exchanges and collection of input from the experts, each TSWG gathered to reflect and identify, based on the information collected, a common vision to set for their industrial circular transformation roadmap. It was also decided to organize 3 roadmapping workshops focusing on the 3 main level of the industrial value-chain : the first workshop was dedicated to materials & resources, the second one to circular product design and the third one to value-recovery & the management of the products' end-of-life.

The 3 workshops followed the same roadmapping process and engaged the participants on 3 key exercises:

1) Identifying potential gaps and barriers in knowledge, technology limitations, market structural barriers, regulatory limitations, public acceptance or other gaps and barriers preventing the industry to achieve the vision set-out following the experts' workshop.
2) Defining solutions and key activities to implement in order to overcome the gaps and barriers previously identified. Those key activities must concern each component of the industrial sector, including technology development and deployment, development of business models and market opportunities, development of regulations and standards, policy formulation, creation of financing mechanisms, and public engagement
3) Assigning the solutions and key activities according to their field (Technology, Business Model, legal/political) and their time-frame (short-term, mid-term, long-term) and voting on the activities that are the most important to implement and achieve.

3. Transnational Sectoral Working Groups implementation

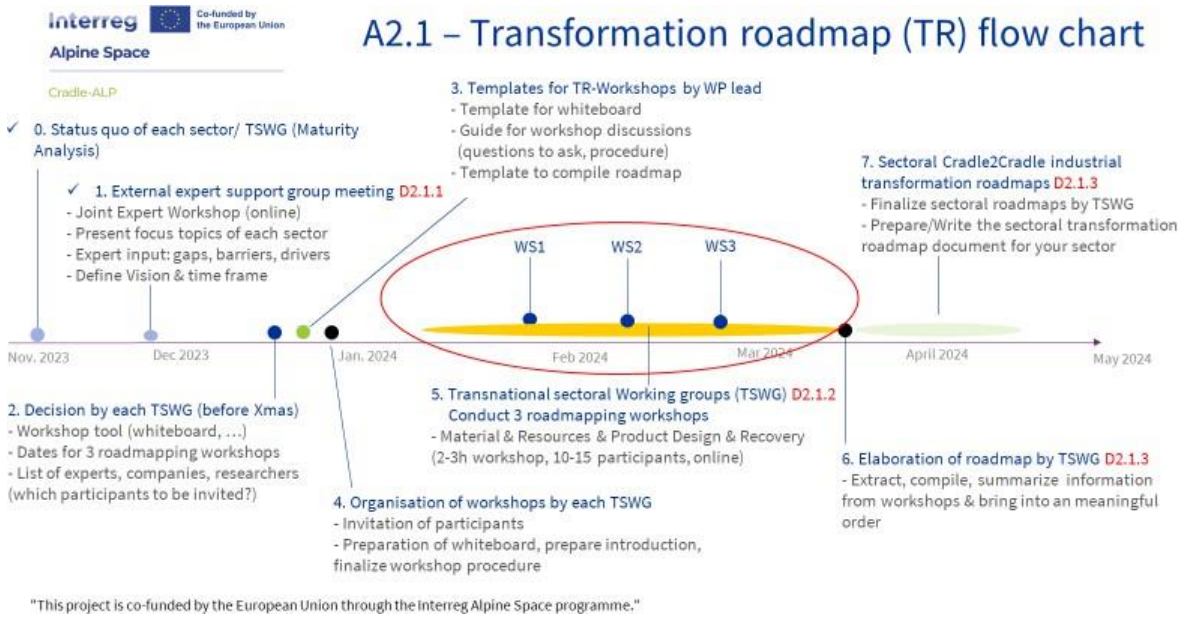
In order to implement the roadmap methodology, 5 transnational sectoral working groups were established and composed of partners with an expertise on the industrial sectors. The composition of the 5 TSWG is illustrated below, in figure 1.



Each industrial sectoral group is composed of partners from at least 3 different regions in order to insure cross-regional exchanges in the elaboration of the Transformation roadmap workshops. The only exception was for the Wood/Furniture sector which gather partners from Italy and Austria, so the Cradle-ALP partners agreed to all participate in participating to the TSWG and promoting the workshops within their own ecosystem in order to gather enterprises from different Alpin Space regions. The lead partner in charge of implementing the TSWG methodology is framed for each industrial sector. This composition of each TSWG was definitively validated by all partners during the Ljubljana project's meeting in July 2023.

Alongside the roadmap methodology, Chemic Cluster Bayern and Polymeris elaborated a workflow process with key deadlines and activities to follow by each TSWG in order to implement the roadmapping methodology in their industrial sector.

The TSWG roadmap workflow and methodology is schematized in the figure below.



Each TSWG had to follow the same methodology in order to define joint procedures for the elaboration and testing of the industrial transformation roadmaps.

4. TSWG WOOD/FURNITURE

4.1 Composition

The TSWG wood/furniture is led by the **Chamber of Commerce of Padova**. Supporting partners include **Unismart** and **Boku.** As the partners involved are from Italy and Austria, the Cradle-ALP partners agreed to all participate in participating to the TSWG and promoting the workshops within their own ecosystem in order to gather enterprises from different Alpine Space regions.

4.2 Internal preparatory meetings

Each TSWG leader was responsible of organising a virtual "kick-off" meeting.The goal of this meeting was to identify the sub-sectors on which each TSWG will focus for the roadmapping activities (ACT2.1) and the Pilot action (ACT2.2), to identify a list of tools that would be of interest for assisting SMEs in the Pilot action and to start the reflexion on potential SMEs and experts to involve in the roadmapping workshops and Pilot actions. Below is a brief summary of the results of the kick-off meetings organized by each TWSG.

The kick-off meeting of the TSWG wood/furniture took place online on October 27th 2024 with all TSWG partners invited. Brainstorming was used to collect ideas for the focus topic within the wood/furniture sector.

The discussion analysed the complexity of the sector, and it was agreed that the workshops would address the furniture and the construction wood sectors for the transformation roadmap.

To effectively tailor the development of the roadmap for the wood and furniture sector, the focus will be refined to emphasize three pivotal topics: chemical additives in wood products, design for disassembly, and Cradle-to-Cradle certification. These topics have been selected for their relevance and potential impact on sustainability and innovation in the industry.

1. **Chemical Additives in Wood Products**:
    - This topic will explore the application of various chemicals that enhance the performance, aesthetics, and durability of wood products. Key additives include:
        - **Adhesives**: For strong, durable joints in furniture and structural elements.
        - **Coatings**: Such as lacquers and varnishes that protect against moisture, UV light, and wear.
        - **Flame Retardants and UV Protectors**: To enhance safety and longevity.
        - **Eco-friendly Additives**: Focus on recyclable and biodegradable additives that support environmental sustainability while maintaining product functionality.
2. **Design for Disassembly (DfD)**:
    - DfD will be highlighted as a critical design approach that enables the easy separation of components for repair, refurbishment, or recycling. This approach not only facilitates circularity but also enhances the product lifecycle management:
        - **Modular Design**: Encouraging designs that allow for easy replacement and upgrading of parts.
        - **Standardized Components**: Using standardized fasteners and joinery to simplify the disassembly process.
        - **Material Selection**: Choosing materials that can be easily separated and recycled, reducing the environmental impact at the end of the product's life.
3. **Cradle-to-Cradle Certification**:
    - Cradle-to-Cradle certification will be discussed as a potential goal for wood and furniture companies, emphasizing the importance of product and process design that looks at the entire life cycle from raw material extraction to end-of-life reintegration:
        - **Material Health**: Ensuring that materials are safe for both humans and the environment throughout the lifecycle.
        - **Material Reutilization**: Designing for material recovery and recycling to keep resources in use.
        - **Renewable Energy Use**: Encouraging the use of renewable energy in production processes.

- **Water Stewardship**: Managing water use and quality in manufacturing.
- **Social Fairness**: Commitment to fair labor practices and community engagement.

In addition to the determination of the focus topic, the TSWG collected ideas for tools and activities that could be used in the pilots actions (A2.2.) and are summarized in the transformation toolbox D1.4.

These ideas comprise different activities for knowledge transfer such as expert workshops, Design Thinking approaches and workshops on Foresight or Sustainable/Circular Business Model design, 1:1 support activities such as the Circularity Compass and networking activities such as matchmaking, speed-dating or bilateral meetings to match the right partners assisted by Cradle-Alp project partners.

4.3 Sectoral ecosystem analysis

Following the identification of sub-topics of focus for the Transformation roadmap and in line with the D1.2.1 ecosystem analysis conducted by each partner in their regional ecosystem, CCB and POL organized a workshop during the Linz project meeting (October 2023) to develop a sectoral ecosystem analysis. Each TSWG gathered gaps, barriers, drivers and potential for their industrial sector and the TSWG leader was in charge of elaborating a transnational sectoral ecosystem analysis taking into consideration the input from each region and partner. This analysis enabled the partner to better define the scopes and objectives of the Transformation roadmap and served as a basis for discussion with the external support group workshop in order to define a vision for each sector.


Wood Furniture
GAPS
REVERSE LOGISTICS NOT FULLY DEVELOPED
POTENTIAL
MATERIAL TRACEABILITY IS A "PLUS" FOR SOME PRODUCTS
WOOD IS A VERY COMMON MATERIAL
DRIVERS
ECO-DESIGN
CIRCULAR BUSINESS MODELS
CRADLE-ALP PROJECT
BARRIERS
Coatings, glue, fasteners
conservative sectors


Gaps
• Reverse logistics not fully developed
• No unified way to recycle
• Building regulations
Potential
• Material traceabiity is a plus for some products
• Policies in forestry management
• Wood is a well-known / studied material
• Increasing marketability of recycled-based furinture
Barriers
• Coatings, glues, fasteners
• Multimaterial
• Legistlation blocking return of EoL products
• Difficulties in separating end recycling
• Conservative sector
Drivers
• Eco-desing
• Module-based constructions, with standardised components
• Customer sensibility
• Circular business models

The gaps, barriers, drivers and potential shown above are results combined from the regional ecosystem analysis, the workshop during the meeting in Linz and the received input from the external expert support group workshop beginning of December 2023.

4.4 External expert support group workshop

The external expert support group workshop was organised online on Dec 7th 2023 with the objective to discuss with experts the roadmap vision for the five sectors and to cross check if any gaps, barriers, drivers and potentials are missing. The following aspects were added:

- Gaps: Lack of complete/comprehensive Life Cycle Assessments proofing the positive impact of a development
- Barriers: Energy-intensive processes such as recycling, especially chemical recycling
- Drivers/Potential: Opportunity to achieve less complex/simplified value chains

The complete overview is found in D2.1.1.

Roadmapping is the process that generates information on the status of products and technologies in an innovation context. A roadmap is a strategic tool to achieve a goal, many times displayed as a visual graphic. It provides information on the type and status quo of research, technological developments and possible challenges translating them into activities, requirements and milestones. To set the frame for discussion with experts from different backgrounds and regions a common vision is necessary for the roadmapping process. The vision formulates an hypothetic objective or, generally speaking, an idea of how the future is imagined.

Based on the discussion and input of the experts, for the TSWG wood/furniture the following vision was elaborated: *"By 2035, the wood and furniture sector will embody a fully circular economy model, where sustainable wood and recyclable materials are foundational. This vision encompasses the entire lifecycle of products—from design through to end-of-life recovery—ensuring that furniture not only serves its purpose but does so with minimal environmental impact. Designs will be modular to facilitate easy disassembly and recycling, reducing waste to landfills by 90%. All wood used will be sourced from sustainably managed forests or consist of recycled materials. The sector will leverage advancements in non-toxic, biodegradable adhesives and finishes to further enhance sustainability. This transformation must be supported by robust consumer education programs to drive demand for circular furniture, and by regulatory frameworks that incentivize sustainable practices within the industry."*.

4.5 Organization of the TSWG roadmapping workshops

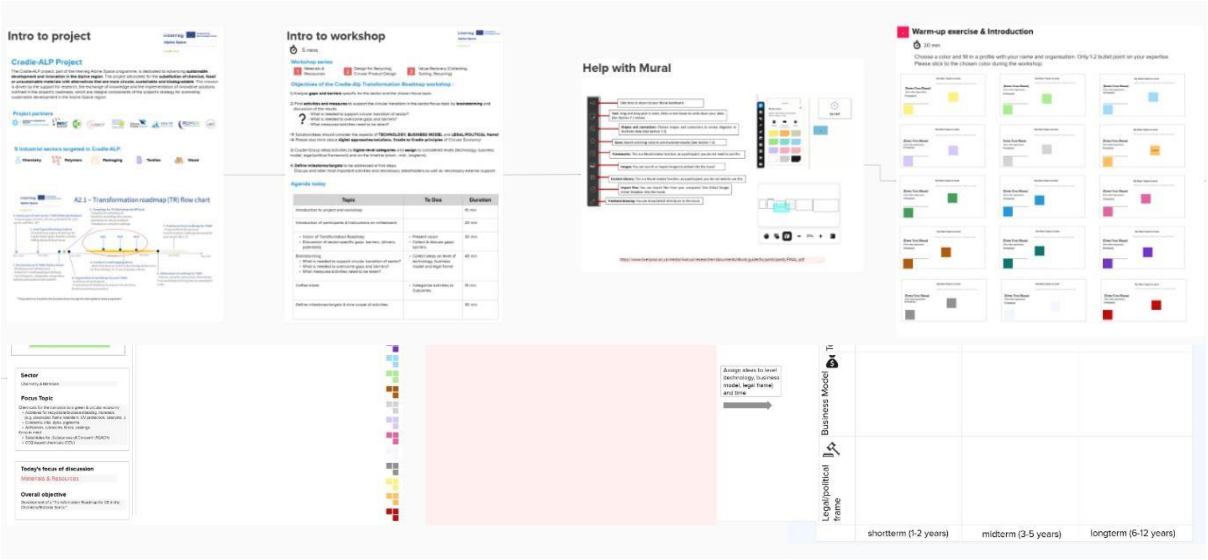
Each TSWG decided individually on the dates and organization of the 3 roadmapping workshops.

The dates and discussion topics of the workshops were as follows:

- Workshop 1: (Raw) materials/resources, February 29th, 2024
- Workshop 2: Product design/Design for recycling, February 29th, 2024
- Workshop 3: Closing the loop (cradle-to-cradle models and certification), March 26th, 2024

For the further organization of the online roadmapping workshops, the TSWG wood/furniture met a few days prior to each workshop, to elaborate a list of suitable companies and research experts from the involved regions, to elaborate an invitation letter and the registration process for the workshop participants, and to decide on roles (moderators) and responsibilities (introduction, moderation of separate parts, notes, screenshots, technical support) of each partner during the workshops.

For the online workshops MS Teams and a MURAL whiteboard were used. The Mural template was common with the other TSWG to ensure a joint methodology for the roadmapping exercises.



On January 31st, 2024 CCB and POL organized a training session for all Cradle-Alp consortium partners in order to familiarize with the template and exercises and to provide guidance in the roadmapping methodology. The session was recorded and is available on the project internal collaborative tool (Trello).

Workshop 1 – Wood/Furniture - materials/resources

Title of the meeting	Cradle ALP: Roadmapping workshop – wood and furniture
Number of participants	12
Starting time	14:00
Ending time	16.00
Duration of the meeting	2 hrs

Link to the Mural used in the meeting:
https://app.mural.co/t/formazionepaolaechiara9429/m/formazionepaolaechiara9429/1706799068907/b8e57d8cccdb82d00b99d94f2f9901b0a70f090a?sender=ufffb96c6c8cf634aa52e2956

The 1st workshop on wood and furniture materials took place on 29th of February 2024 by using **ZOOM** for video conferencing and **Mural Whiteboard** for interactive collaboration. There were 12 participants.

Firstly, the CradleAlp project and its goals were briefly introduced, outlining the sectors included in the project - chemistry, polymers, wood, textile, and packaging. It was emphasized that this workshop would focus on chemicals for transitioning to a green and circular economy, such as additives for recyclable, biobased, compostable materials including colorants, inks, pigments, adhesives, lubricants, fillers, and coatings.

Following the outcomes of all workshop brainstorming sessions, a roadmap will be prepared, and up to 15 SMEs will be supported in transforming their production processes or products to be more sustainable.

During the first workshop, attention was given to identifying gaps and barriers, and ideas were gathered from participants, focusing on transforming manufacturing processes or products. Brainstorming centred around three areas - Technology, Business Model, and Policy/Legal framework, with consideration given to the Cradle to Cradle concept. Later, these ideas will be clustered, and a roadmap for the chemistry/materials sector will be developed.

Additionally, participants engaged in a warm-up exercise by writing down their names and areas of expertise.

5. Presentation of vision and objective

Continuing, the vision and objectives of this group were presented. It was explained that a roadmap is a strategic tool aimed at achieving a specific goal or outlining a path from the current status quo to realizing the envisioned future.

Presentation of gaps & barriers
Discussion on missing gaps & barriers to complete the analysis

The gaps and barriers previously identified in the workshop with experts were presented to the participants. They were encouraged to review the list and suggest any additional gaps or barriers they believed were still missing.

Gaps: What is missing from our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Sustainable Sourcing and Deforestation: Addressing the issue of illegal logging and deforestation, which accounts for about 30% of wood used in the EU.
- Circular Economy and Tech Education: Need for more training on circular economy principles and Industry 4.0 technologies.
- Transparency in Material Safety: Lack of disclosure regarding hazardous substances in products.
- Availability of Spare Parts and Repair Instructions: Difficulty in obtaining spare parts and lack of guidance for furniture repair.
- Recycling and Reuse Systems: Limited focus on reuse compared to recycling, incineration, and landfill (cradle to grave approach).
- Reverse Logistics: Challenges in collection and reverse logistics systems.
- Regulatory Clarity: Ambiguity in regulations, often not treating wood-furniture waste appropriately.
- Greenwashing Practices: Proliferation of misleading claims about environmental practices.

- **Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Wood-Furniture industry?**

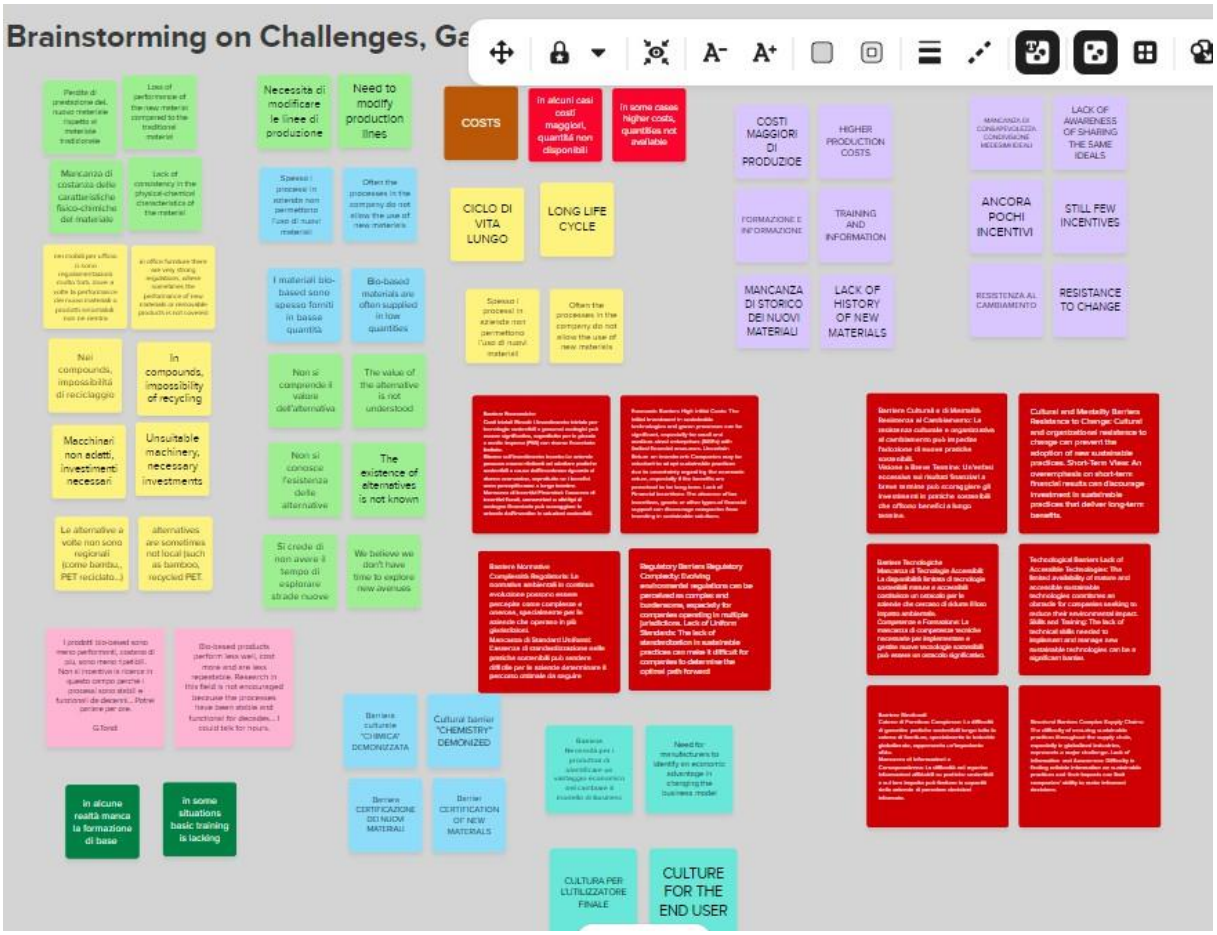
- Cost and Price Disparity: The price gap between new and used furniture is not significant enough to encourage sustainable purchasing behaviors. High costs of repair and refurbishment.
- Quality and Durability Concerns: Perceptions about the quality of recycled or sustainably sourced wood products.
- Complex Supply Chains and Traceability: Difficulty in tracing wood origins and ensuring sustainability.
- Market Competition: Intense competition with low-cost, non-sustainable furniture producers.
- Technological Gaps: Lack of efficient technology for recycling and repurposing wood materials.
- Design Limitations: Traditional design practices not aligned with circular principles.

- **Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Wood-Furniture industry?**

- Growing Environmental Awareness: Increasing consumer awareness and demand for sustainable and circular furniture products.
- Integration of Industry 4.0 Technologies: Adoption of IoT, cloud computing, data analytics, and artificial intelligence in the wood-furniture sector.
- Policy and Regulatory Support: Implementation of supportive policies and regulations encouraging circular practices.
- Innovation in Materials and Processes: Development of new materials and processes that enhance circularity.

- Collaboration and Partnerships: Increased collaboration between manufacturers, suppliers, and recyclers.
- Sustainable Design Education: Promoting eco-design principles in the furniture design and manufacturing process.
- Circular Business Models: Development of business models focusing on product-as-a-service, leasing, or take-back schemes.

Gaps and barriers that were added by the participants:



1. Loss of performance of the new material compared to the traditional material
2. Lack of consistency in the physical-chemical characteristics of the material
3. In office furniture there are very strong regulations, where sometimes the performance of new materials or removable products is not covered
4. Unsuitable machinery, necessary investments
5. In compounds, impossibility of recycling
6. Alternatives are sometimes not local (such as bamboo, recycled PET
7. Bio-based products perform less well, cost more and are less repeatable. Research in this field is not encouraged because the processes have been stable and functional for decades... I could talk for hours.
8. In some situations, basic training is lacking
9. Need to modify production lines
10. Often the processes in the company do not allow the use of new materials
11. Bio-based materials are often supplied in low quantities
12. LONG LIFE CYCLE
13. Often the processes in the company do not allow the use of new materials
14. In some cases, higher costs, quantities not available
15. HIGHER PRODUCTION COSTS
16. TRAINING AND INFORMATION
17. LACK OF HISTORY OF NEW MATERIALS

18. Cultural barrier "CHEMISTRY" DEMONIZED
19. Barrier CERTIFICATION OF NEW MATERIALS
20. Economic Barriers High Initial Costs: The initial investment in sustainable technologies and green processes can be significant, especially for small and medium-sized enterprises (SMEs) with limited financial resources. Uncertain Return on Investment: Companies may be reluctant to adopt sustainable practices due to uncertainty regarding the economic return, especially if the benefits are perceived to be long-term. Lack of Financial Incentives: The absence of tax incentives, grants or other types of financial support can discourage companies from investing in sustainable solutions.
21. Regulatory Barriers Regulatory Complexity: Evolving environmental regulations can be perceived as complex and burdensome, especially for companies operating in multiple jurisdictions. Lack of Uniform Standards: The lack of standardization in sustainable practices can make it difficult for companies to determine the optimal path forward
22. Need for manufacturers to identify an economic advantage in changing the business model
23. CULTURE FOR THE END USER
24. Cultural and Mentality Barriers Resistance to Change: Cultural and organizational resistance to change can prevent the adoption of new sustainable practices. Short-Term View: An overemphasis on short-term financial results can discourage investment in sustainable practices that deliver long-term benefits.
25. Technological Barriers Lack of Accessible Technologies: The limited availability of mature and accessible sustainable technologies constitutes an obstacle for companies seeking to reduce their environmental impact. Skills and Training: The lack of technical skills needed to implement and manage new sustainable technologies can be a significant barrier.
26. Structural Barriers Complex Supply Chains: The difficulty of ensuring sustainable practices throughout the supply chain, especially in globalized industries, represents a major challenge. Lack of Information and Awareness: Difficulty in finding reliable information on sustainable practices and their impacts can limit companies' ability to make informed decisions.
27. We believe we don't have time to explore new avenues
28. The existence of alternatives is not known
29. The value of the alternative is not understood
30. LACK OF AWARENESS OF SHARING THE SAME IDEALS
31. STILL FEW INCENTIVES
32. RESISTANCE TO CHANGE

Findings & Solutions: brainstorming for ideas, activities, measures to be taken

In the next exercise, participants were presented with a Miro board containing a brainstorming session aimed at finding solutions to overcome the identified gaps and barriers. The overarching vision of achieving clean material cycles through sustainable chemicals available at scale in the Alpine Space by 2035 was kept in mind throughout the exercise.

Participants focused their efforts on three key fields: technology, business models, and legal framework. They brainstormed ideas and strategies aimed at addressing the identified issues within each of these areas, with the goal of advancing towards the envisioned future.

Some solutions were suggested.

Short term:

1. Incentivize the market and production towards sustainable systems by providing a need for such models. The market is increasingly attentive to quality and sustainability of products
2. Observing from different points of view gives rise to innovation
3. 4.0 technologies promote traceability of products, processes and materials
4. Creating value through sustainability. Differentiate yourself from competitors
5. Understanding the starting point of your company, in order to find ways of improvement, leads to making processes more efficient
6. Education and Training: Investing in staff training on sustainability issues can improve awareness and facilitate the adoption of new practices....
7. STAKEHOLDER, even political: pay attention and create culture in order to impact research/costs
8. Think about incentives for companies that recover their products and reuse them
9. Government policies aimed at developing innovative patents to be made public
10. Material Passport

Midterm:

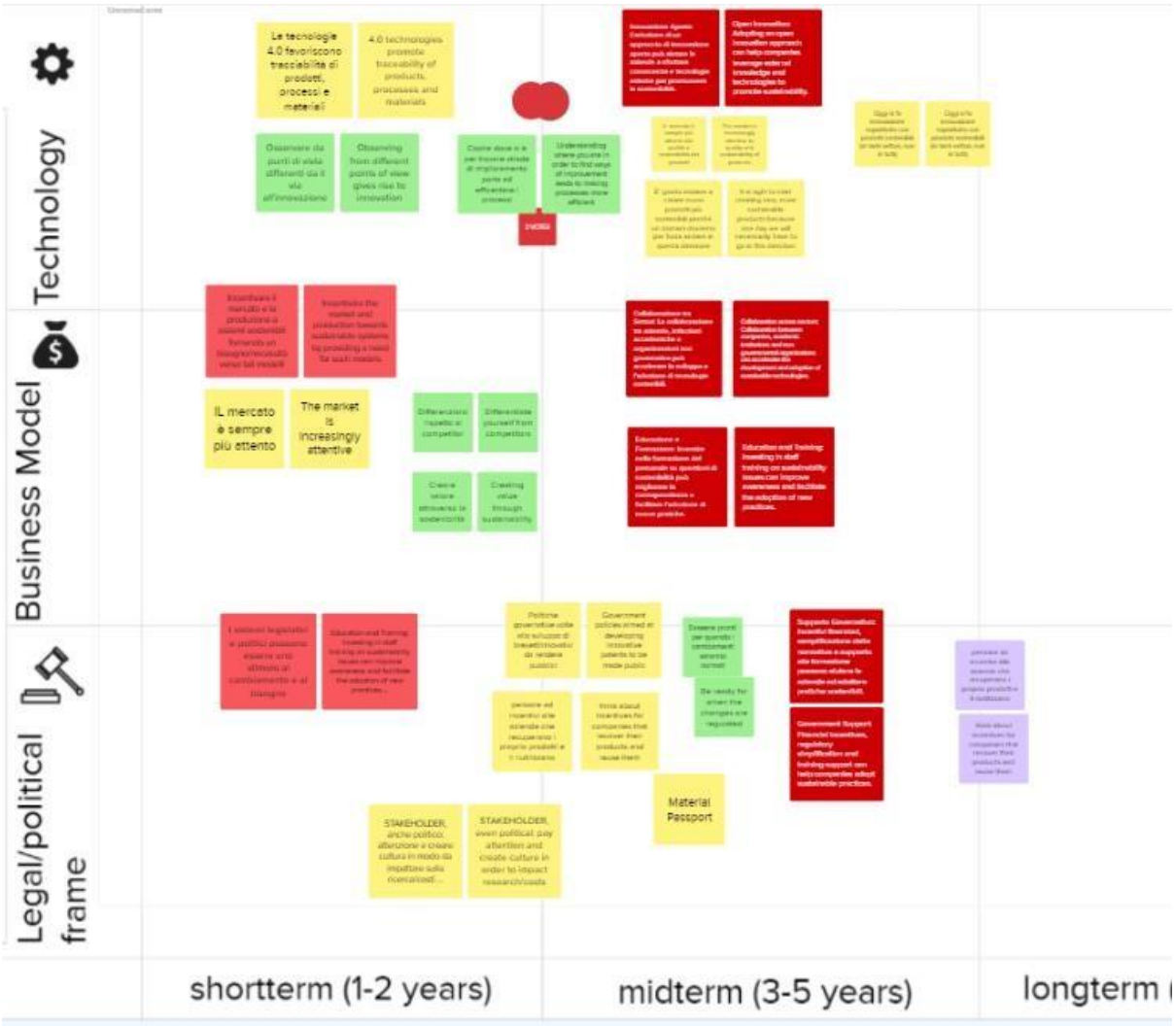
11. Open Innovation: adopting an open innovation approach can help companies leverage external knowledge and technologies to promote sustainability.
12. It is right to start creating new, more sustainable products because one day we will necessarily have to go in this direction
13. Collaboration across sectors: collaboration between companies, academic institutions and non-governmental organizations can accelerate the development and adoption of sustainable technologies.
14. Education and Training: investing in staff training on sustainability issues can improve awareness and facilitate the adoption of new practices.
15. Be ready for when the changes are regulated
16. Government Support: financial incentives, regulatory simplification and training support can help companies adopt sustainable practices.

Assignment of collected activities/ timeline, prioritizing measures

In this part, participants were tasked with organizing the collected ideas into tables corresponding to the fields of technology, business models, and legal framework. They were

instructed to consider short-term, mid-term, and long-term measures, aligning with the timeline for achieving the overarching vision.

For each category (technology, business models, legal framework), the ideas were sorted based on their relevance to short-term (immediate), mid-term (within a few years), and long-term (more distant) implementation. This organization facilitated a comprehensive understanding of the proposed solutions and their potential timelines for execution.



A roadmap that will be developed from these workshops will be available to all the participants.

At the end of the session, there was a discussion focusing on the development of new technology.

By voting at the end, participants chose the actions that they consider the most important to start this transformation from fossil- to bio-based products.

3 votes were given to:

1. Collaboration across sectors: collaboration between companies, academic institutions and non-governmental organizations can accelerate the development and adoption of sustainable technologies.
2. Creating value through sustainability. Differentiate yourself from competitors.
3. Understanding the starting point of your company, to find ways of improvement, leads to making processes more efficient.

Workshop 2 - Design for disassembly/recycling and circular product design

Title of the meeting	Cradle ALP: Roadmapping workshop – wood and furniture
Number of participants	11
Starting time	11:00
Ending time	13:00
Duration of the meeting	2 hrs

Link to the Mural used in the meeting:
https://app.mural.co/t/formazionepaolaechiara9429/m/formazionepaolaechiara9429/1706799068907/b8e57d8cccdb82d00b99d94f2f9901b0a70f090a?sender=ufffb96c6c8cf634aa52e2956

Presentation of vision and objective

Continuing, the vision and objectives of this group were presented. It was explained that a roadmap is a strategic tool aimed at achieving a specific goal or outlining a path from the current status quo to realizing the envisioned future.

Presentation of gaps & barriers
Discussion on missing gaps & barriers to complete the analysis

The gaps and barriers previously identified in the workshop with experts were presented to the participants. They were encouraged to review the list and suggest any additional gaps or barriers they believed were still missing.

Gaps: What is missing from our regional ecosystems to achieve circularity in the Wood-Furniture industry?

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- Recycling and Reuse Systems: Limited focus on reuse compared to recycling, incineration, and landfill (cradle to grave approach).
- Reverse Logistics: Challenges in collection and reverse logistics systems.
- Regulatory Clarity: Ambiguity in regulations, often not treating wood-furniture waste appropriately.
- Greenwashing Practices: Proliferation of misleading claims about environmental practices.

Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Cost and Price Disparity: The price gap between new and used furniture is not significant enough to encourage sustainable purchasing behaviors. High costs of repair and refurbishment.
- Quality and Durability Concerns: Perceptions about the quality of recycled or sustainably sourced wood products.

- Complex Supply Chains and Traceability: Difficulty in tracing wood origins and ensuring sustainability.
- Market Competition: Intense competition with low-cost, non-sustainable furniture producers.
- Technological Gaps: Lack of efficient technology for recycling and repurposing wood materials.
- Design Limitations: Traditional design practices not aligned with circular principles.

Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Growing Environmental Awareness: Increasing consumer awareness and demand for sustainable and circular furniture products.
- Integration of Industry 4.0 Technologies: Adoption of IoT, cloud computing, data analytics, and artificial intelligence in the wood-furniture sector.
- Policy and Regulatory Support: Implementation of supportive policies and regulations encouraging circular practices.
- Innovation in Materials and Processes: Development of new materials and processes that enhance circularity.
- Collaboration and Partnerships: Increased collaboration between manufacturers, suppliers, and recyclers.
- Sustainable Design Education: Promoting eco-design principles in the furniture design and manufacturing process.
- Circular Business Models: Development of business models focusing on product-as-a-service, leasing, or take-back schemes.

Gaps and barriers that were added by the participants:

1. Market Competition: Intense competition with low-cost, non-sustainable furniture producers.
2. In Italy many medium and small-sized companies invest little in research and development, and when they do, the main objective is aesthetics and usability, rather than eco-design for disassembly or the use of materials with a view to circularity.

3. Customers agree in principle on sustainability issues, but when it comes to purchasing products for their home (windows and doors for example) one of the main criteria of choice, if not the first, is the cost.
4. Accessing and managing tenders that favour the transformation of business models from a green perspective is complicated.
5. There is a need for more training on circular economy principles and Industry 4.0 technologies: clients particularly are not aware.Findings & Solutions: brainstorming for ideas, activities, measures to be taken

In the next exercise, participants were presented with a Miro board containing a brainstorming session aimed at finding solutions to overcome the identified gaps and barriers. The overarching vision of achieving clean material cycles through sustainable chemicals available at scale in the Alpine Space by 2035 was kept in mind throughout the exercise.

Participants focused their efforts on three key fields: technology, business models, and legal framework. They brainstormed ideas and strategies aimed at addressing the identified issues within each of these areas, with the goal of advancing towards the envisioned future.

Some solutions were suggested:

Short term:

17. Life Cycle Analysis (LCA) Use life cycle analysis to evaluate the environmental impact of products at all stages of their life, from production to disposal. This can help companies identify critical areas and opportunities for improvement towards sustainability.
18. Research and development Investing in research and development to find new sustainable materials, low-impact production processes and innovative eco-design solutions. This can lead to the creation of products that are not only environmentally friendly but also cost-effective.…
19. Inform the user on sustainable issues for a more informed choice.
20. Encourage collaborations between organizations and companies.
21. Circular Business Models Adopt business models based on the principles of the circular economy, where products are designed to be repaired, reused, refurbished, or recycled. This reduces dependence on natural resources and minimizes waste.
22. Probably more in Italy than abroad... but the laws themselves must try to direct the industrial path towards circularity. Putting all companies on the same level... otherwise to survive they will always be looking for the fastest way to optimize profits
23. Standardization and Certifications Developing unified, internationally recognized standards for eco-design can make it easier for companies to assess the environmental impact of their products and processes. Environmental certifications can also serve as a marketing tool to demonstrate a company's commitment to sustainability.
24. University course in materials technology with sustainability focus
25. Government policies that reward companies that apply gradually revisited processes of sustainability in materials, production processes with also recovery of materials at the end of their life (e.g. Mosa)

Midterm:

26. Innovative technologies for the reuse of materials (e.g. 3D printing of wood)
27. Investments in research and development for technologies that allow the circularity of the system. I'll give you the example of organic paints
28. Update the technical offices so that they actively dedicate themselves to the design of the disassembly phase as well.
29. As we have talked about ignorance... so the solution must be a multi-level training plan, also starting from school.
30. Autarky Italian-made protection materials
31. Policies against greenwashing
32. Material passport

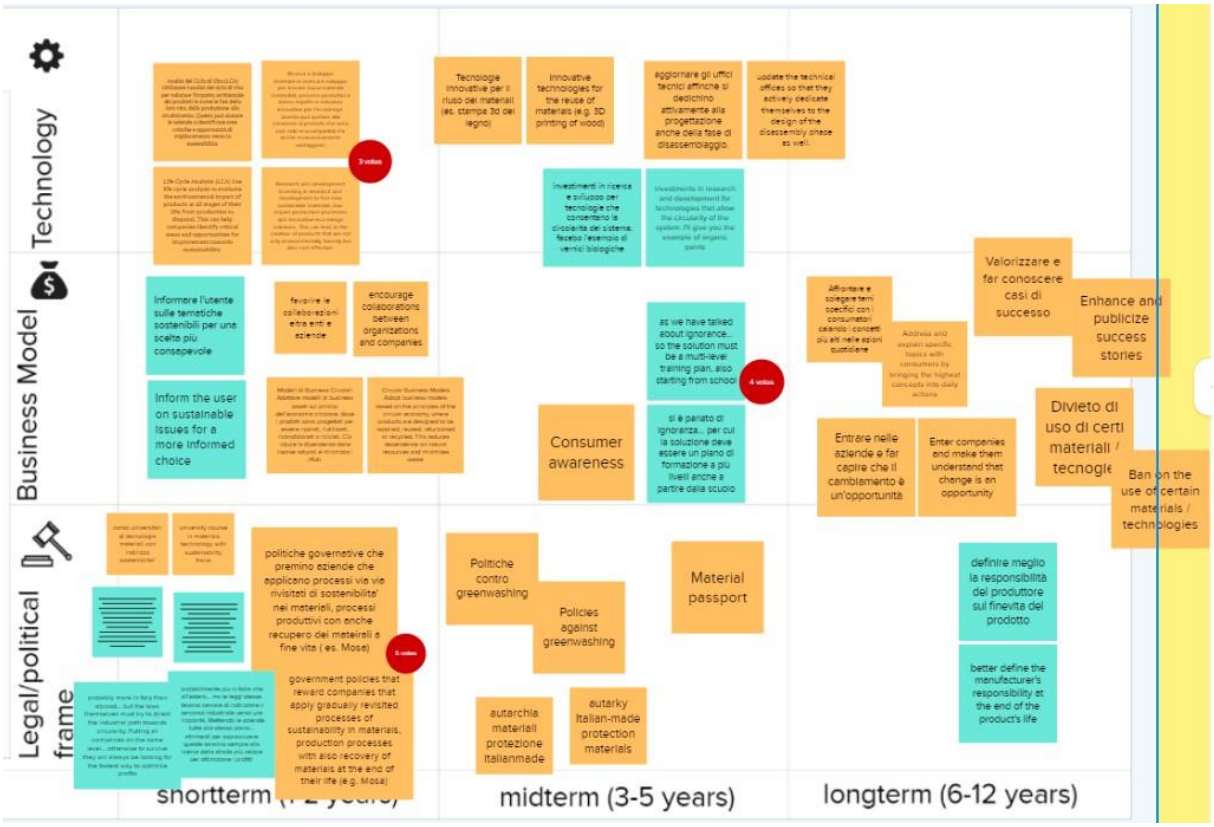
Long term:

33. Address and explain specific topics with consumers by bringing the highest concepts into daily actions.
34. Enter companies and make them understand that change is an opportunity.
35. Better define the manufacturer's responsibility at the end of the product's life
36. Enhance and publicize success stories.
37. Ban on the use of certain materials / technologies.

Assignment of collected activities/ timeline, prioritising measures

In this part, participants were tasked with organizing the collected ideas into tables corresponding to the fields of technology, business models, and legal framework. They were instructed to consider short-term, mid-term, and long-term measures, aligning with the timeline for achieving the overarching vision.

For each category (technology, business models, legal framework), the ideas were sorted based on their relevance to short-term (immediate), mid-term (within a few years), and long-term (more distant) implementation. This organization facilitated a comprehensive understanding of the proposed solutions and their potential timelines for execution.



A roadmap that will be developed from these workshops will be available to all the participants.

At the end of the session, there was a discussion focusing on the development of new technology.

By voting at the end, participants chose the actions that they consider the most important to start this transformation from fossil- to bio-based products.

Workshop 3 - Closing the loop (cradle-to-cradle models and certification),

Title of the meeting	Cradle ALP: Roadmapping workshop – wood and furniture
Number of participants	15
Starting time	14:00
Ending time	16.00
Duration of the meeting	2 hrs

Link to the Mural used in the meeting:
https://app.mural.co/t/formazionepaolaechiara9429/m/formazionepaolaechiara9429/1706799068907/b8e57d8cccdb82d00b99d94f2f9901b0a70f090a?sender=ufffb96c6c8cf634aa52e2956

The 1st workshop on wood and furniture materials took place on 26th of March 2024 by using **ZOOM** for video conferencing and **Mural Whiteboard** for interactive collaboration. There were 15 participants.

Firstly, the CradleAlp project and its goals were briefly introduced, outlining the sectors included in the project - chemistry, polymers, wood, textile, and packaging. It was emphasized that this workshop would focus on chemicals for transitioning to a green and circular economy, such as additives for recyclable, biobased, compostable materials including colorants, inks, pigments, adhesives, lubricants, fillers, and coatings.

Following the outcomes of all workshop brainstorming sessions, a roadmap will be prepared, and up to 15 SMEs will be supported in transforming their production processes or products to be more sustainable.

During the first workshop, attention was given to identifying gaps and barriers, and ideas were gathered from participants, focusing on transforming manufacturing processes or products. Brainstorming centred around three areas - Technology, Business Model, and Policy/Legal framework, with consideration given to the Cradle to Cradle concept. Later, these ideas will be clustered, and a roadmap for the chemistry/materials sector will be developed.

Additionally, participants engaged in a warm-up exercise by writing down their names and areas of expertise.

Presentation of vision and objective

Continuing, the vision and objectives of this group were presented. It was explained that a roadmap is a strategic tool aimed at achieving a specific goal or outlining a path from the current status quo to realizing the envisioned future.

Presentation of gaps & barriers
Discussion on missing gaps & barriers to complete the analysis

The gaps and barriers previously identified in the workshop with experts were presented to the participants. They were encouraged to review the list and suggest any additional gaps or barriers they believed were still missing.

Gaps: What is missing from our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Sustainable Sourcing and Deforestation: Addressing the issue of illegal logging and deforestation, which accounts for about 30% of wood used in the EU.
- Circular Economy and Tech Education: Need for more training on circular economy principles and Industry 4.0 technologies.
- Transparency in Material Safety: Lack of disclosure regarding hazardous substances in products.
- Availability of Spare Parts and Repair Instructions: Difficulty in obtaining spare parts and lack of guidance for furniture repair.
- Recycling and Reuse Systems: Limited focus on reuse compared to recycling, incineration, and landfill (cradle to grave approach).
- Reverse Logistics: Challenges in collection and reverse logistics systems.
- Regulatory Clarity: Ambiguity in regulations, often not treating wood-furniture waste appropriately.
- Greenwashing Practices: Proliferation of misleading claims about environmental practices.

Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Cost and Price Disparity: The price gap between new and used furniture is not significant enough to encourage sustainable purchasing behaviors. High costs of repair and refurbishment.
- Quality and Durability Concerns: Perceptions about the quality of recycled or sustainably sourced wood products.
- Complex Supply Chains and Traceability: Difficulty in tracing wood origins and ensuring sustainability.
- Market Competition: Intense competition with low-cost, non-sustainable furniture producers.

- Technological Gaps: Lack of efficient technology for recycling and repurposing wood materials.
- Design Limitations: Traditional design practices not aligned with circular principles.

Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Wood-Furniture industry?

- Growing Environmental Awareness: Increasing consumer awareness and demand for sustainable and circular furniture products.
- Integration of Industry 4.0 Technologies: Adoption of IoT, cloud computing, data analytics, and artificial intelligence in the wood-furniture sector.
- Policy and Regulatory Support: Implementation of supportive policies and regulations encouraging circular practices.
- Innovation in Materials and Processes: Development of new materials and processes that enhance circularity.
- Collaboration and Partnerships: Increased collaboration between manufacturers, suppliers, and recyclers.
- Sustainable Design Education: Promoting eco-design principles in the furniture design and manufacturing process.
- Circular Business Models: Development of business models focusing on product-as-a-service, leasing, or take-back schemes.

Gaps and barriers that were added by the participants:

- The lack of knowledge about certification
- Not having a circular view of the product
- Not understand the benefit of certification
- Not structuring a path towards circularity
- We as a company care a lot about the topic of the circular economy, in fact a few years ago we started drawing up a sustainability report. I believe that every producer must start thinking in a sustainable way even with very small steps because otherwise we cannot move forward, obviously the clearer the topic the better the response from companies could be. I totally agree with The Architect.
- Logistics for secondary raw material market.
- THE COST OF THE PROCESS

- Regulations and policies related to waste management, product labelling and environmental standards.
- Consumer demand for low-cost and trendy furniture often prioritize price and style over sustainability.
- Many small suppliers and subcontractors are starting just now to respond to audits and to comply with sustainability processes.
- We worked 10 years for Stella McCartney, and she was very involved with sustainability and environment.
- RESISTANCE TOWARD NEW WAYS OF THINKING THE OWN PRODUCTS PROCESS
- Mimetic behaviour (competitors) or being the supplier of a company that asks for... Then they understand
- It is difficult for medium and small companies to collect data about products and processes.
- Higer costs. Costs for developing products made for circular economy
- Little requests from clients

6. Findings & Solutions: brainstorming for ideas, activities, measures to be taken

In the next exercise, participants were presented with a Miro board containing a brainstorming session aimed at finding solutions to overcome the identified gaps and barriers. The overarching vision of achieving clean material cycles through sustainable chemicals available at scale in the Alpine Space by 2035 was kept in mind throughout the exercise.

Participants focused their efforts on three key fields: technology, business models, and legal framework. They brainstormed ideas and strategies aimed at addressing the identified issues within each of these areas, with the goal of advancing towards the envisioned future.

Some solutions were suggested.

Short term:

- Establish a regulation that encourages companies to assess the sustainability of their products.
- Giving value to the product through sustainability and communicating it
- Economic advantages for those who get the certification
- Think sustainably from the start. In the sense that in addition to reviewing the production system and understanding what should be fixed to improve corporate sustainability, a manufacturer should train its employees on the topic so that they can develop sustainable projects already in the design or project idea phase.
- Re-think the way we design products
- Encourages /discourages governative laws

- Raise consciousness in new generations and increase training courses regarding that at school and higher education.
- Make LCAs the ground structure in product design
- Continuos training in a Cradle2Cradle dimension
- Higher taxes for new products
- Put your business idea into discussion.

Midterm:

- Servitization
- Funding
- Starting fron the design taking into account requirements of circularity and C2C certification
- EU regulations to align all member states
- Business models based on closing the loop (not primary production)
- Review step by step actual single product process in a cradletocradle vision to avoid eccessive cost
- Develope products made for circular economy
- Start with simple design modifications to initiate change
- Encourages /+discourages governative laws
- Incentivising companies that undertake concrete circularity and certification paths
- Governative contest cradletocradle within national and international fair
- Globally communicating circularity more and more concretely to customers.

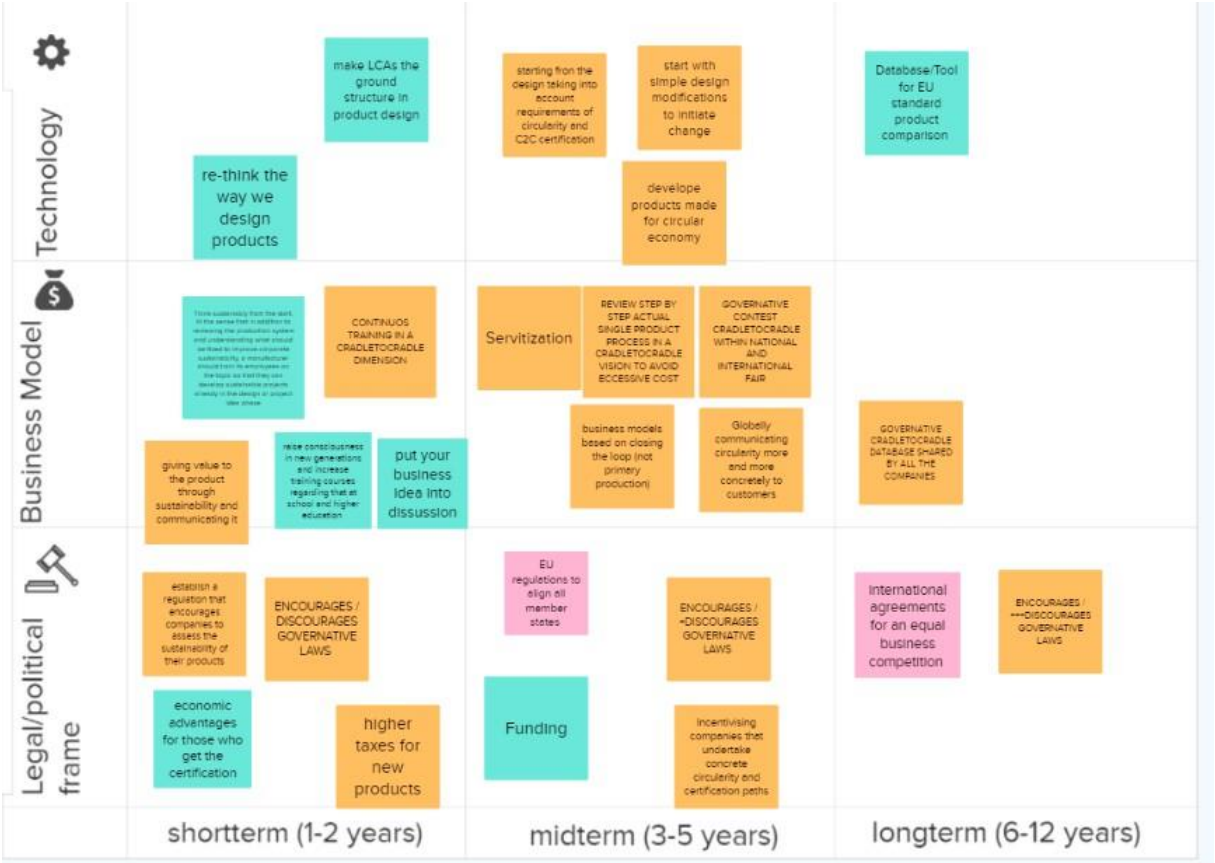
Long term:

- International agreements for an equal business competition
- Governative C2C database shared by all the companies
- Database/tool for eu standard product comparison
- Encourages /+++discourages governative laws

Assignment of collected activities/ timeline, prioritizing measures.

In this part, participants were tasked with organizing the collected ideas into tables corresponding to the fields of technology, business models, and legal framework. They were instructed to consider short-term, mid-term, and long-term measures, aligning with the timeline for achieving the overarching vision.

For each category (technology, business models, legal framework), the ideas were sorted based on their relevance to short-term (immediate), mid-term (within a few years), and long-term (more distant) implementation. This organization facilitated a comprehensive understanding of the proposed solutions and their potential timelines for execution.



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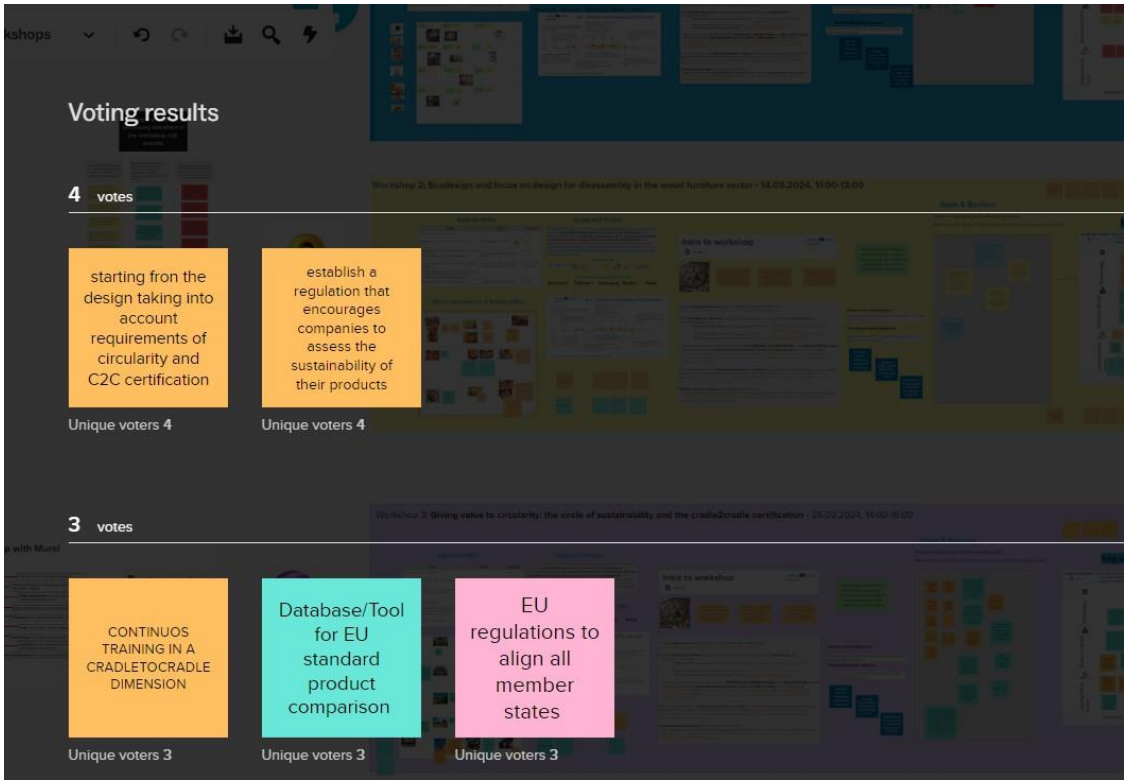

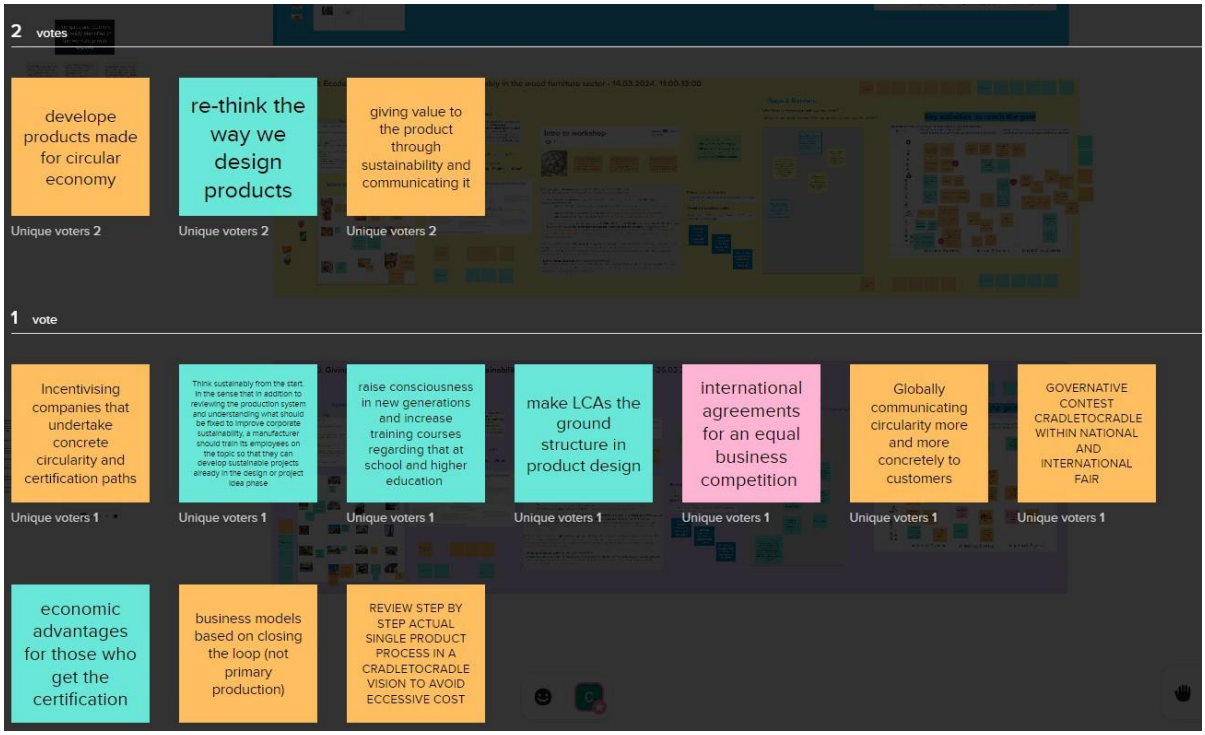

4 votes were given to:

- Take into account C2C requirements form the design.
- Establish a regulation that encourages companies to assess sustainability.

7. Conclusion

In general, a roadmapping process is always a laborious task. In the specific case of the Cradle-Alp project this was even more complex as we had to find subtopics for each of the five targeted industry sectors (chemicals/materials, polymers, packaging, textile, wood/furniture) to avoid that we elaborate roadmaps with similar content.

The Cradle-Alp project has demonstrated significant strides towards sustainable transformation within the wood/furniture sector of the Alpine region. By adopting cradle-to-cradle principles, this sector is paving the way for a comprehensive integration of circular economy processes, showcasing the tangible benefits of sustainability in industrial practices.

Throughout the project, the wood/furniture sector faced unique challenges due to its dependence on natural resources and the peculiarities of product life cycles. However, through dedicated roadmapping workshops, stakeholders identified key areas for improvement, including the reduction of chemical additives, enhancement of design for disassembly, and promotion of Cradle-to-Cradle certification. These focus areas were not only relevant but also critical in steering the sector towards more sustainable operational models.

Collaboration has been pivotal in these efforts. By engaging a transnational network of industry experts, academics, and policymakers, the project harnessed a wide range of insights to refine strategies and implementation steps. This collective wisdom underpinned the roadmap's development, ensuring that the proposed actions were both innovative and practical.

In alignment with the proposal it was decided that the roadmaps will cover three levels (technologies, business models, legal/political framework) and that the experts should discuss three separate topics with in the scope of circular economy/cradle to cradle: resources/(raw) materials, design for recycling, value recovery/closing the loop. Therefore, it was the aim to invite experts for each of these three topics. In the end, it turned out that most experts participated in several workshops not distinguishing between the separate focus topics. This made the discussions more general and outcomes more repetitive and not as specific as expected.

Looking forward, the challenge for the wood/furniture sector is to embrace a proactive stance on adapting to new technologies and market demands will be key to achieving sustained success. Stakeholders across the Alpine region are encouraged to remain engaged, share knowledge, and drive innovation, ensuring that the wood/furniture sector remains at the forefront of sustainable industrial practice.