Project Acronym: Cradle-Alp

Project number: ASP0100003

D.2.1.2

Transnational sectoral working groups (TSWG)

WP n°:	2
Activity n°:	**2.1**
TSWG:	**Textile**
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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 Chemie 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.
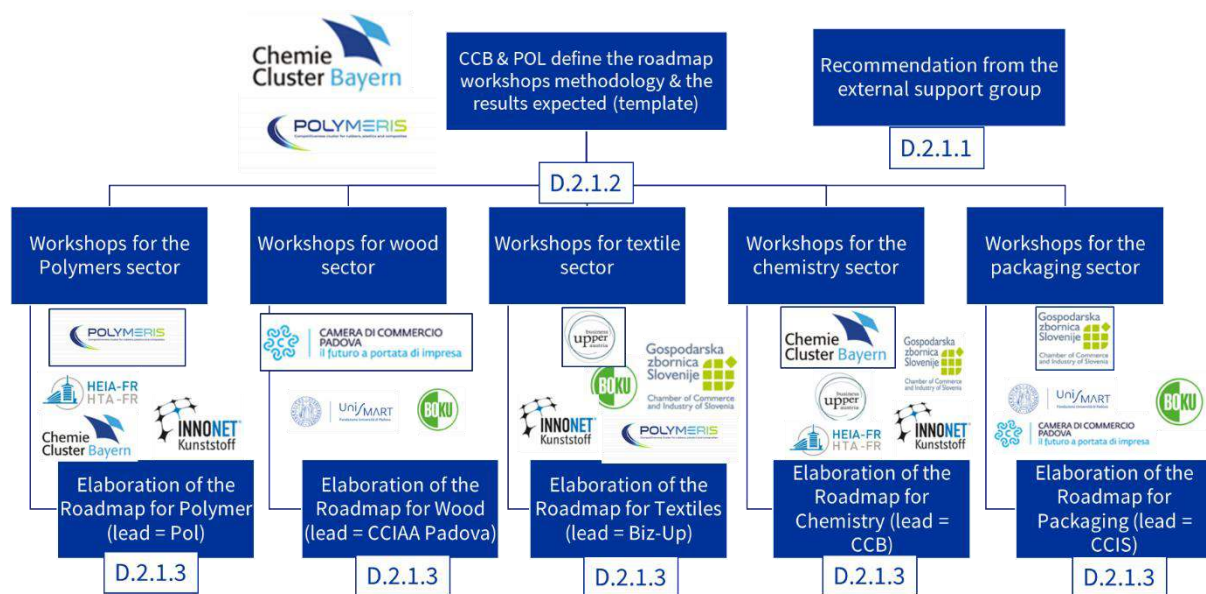
Each industrial sectoral group is composed of partners from at least 3 different regions in order to insure cross-regional exchanges in the elaboration of the Transformation roadmap workshops. The only exception was for the Wood/Furniture sector which gather partners from Italy and Austria, so the Cradle-ALP 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, Chemie 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.

"This project is co-funded by the European Union through the Interreg Alpine Space programme."
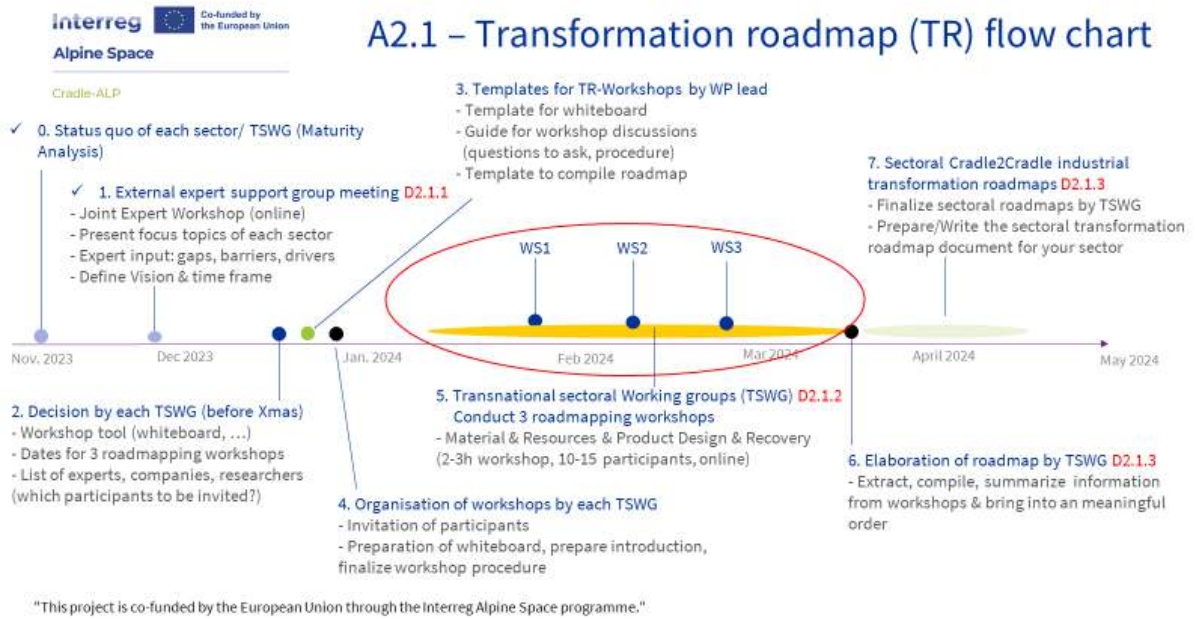
Each TSWG had to follow the same methodology in order to define joint procedures for the elaboration and testing of the industrial transformation roadmaps.

TSWG TEXTILE

4.1 Composition

Provide the list of partners and the name of the lead partner, and the region covered by your TSWG

| Business Upper Austria (Lead) | Upper Austria, Austria |
Chamber of Commerce and Industry of Slovenia	Slovenia
INNONET Kunststoff	Horb, Germany
University of Natural Resources and Life Sciences	Vienna, Austria

4.2 Internal preparatory meetings

Each TSWG leader was responsible of organising a virtual "kick-off" meeting with all the partners involved in its sectorial group before the 15th of September. 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
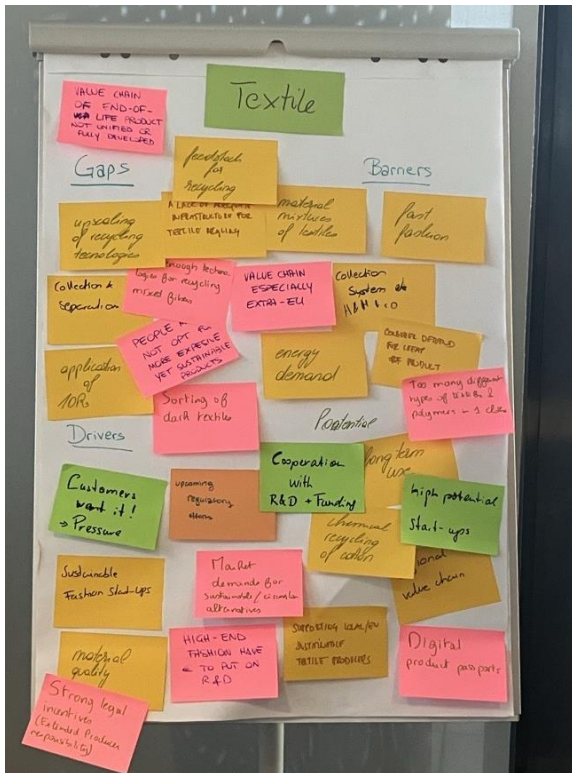
The industrial sector during the kick-off meeting of the Textile- TSWG was held on 11th of September 2023.
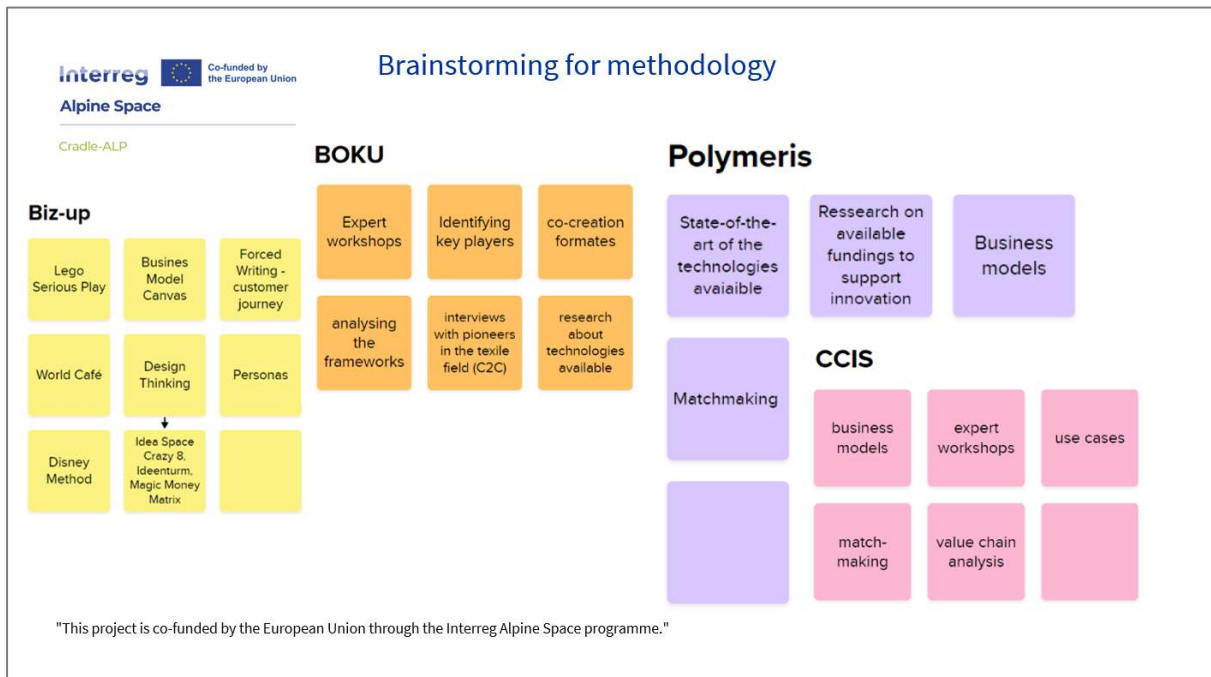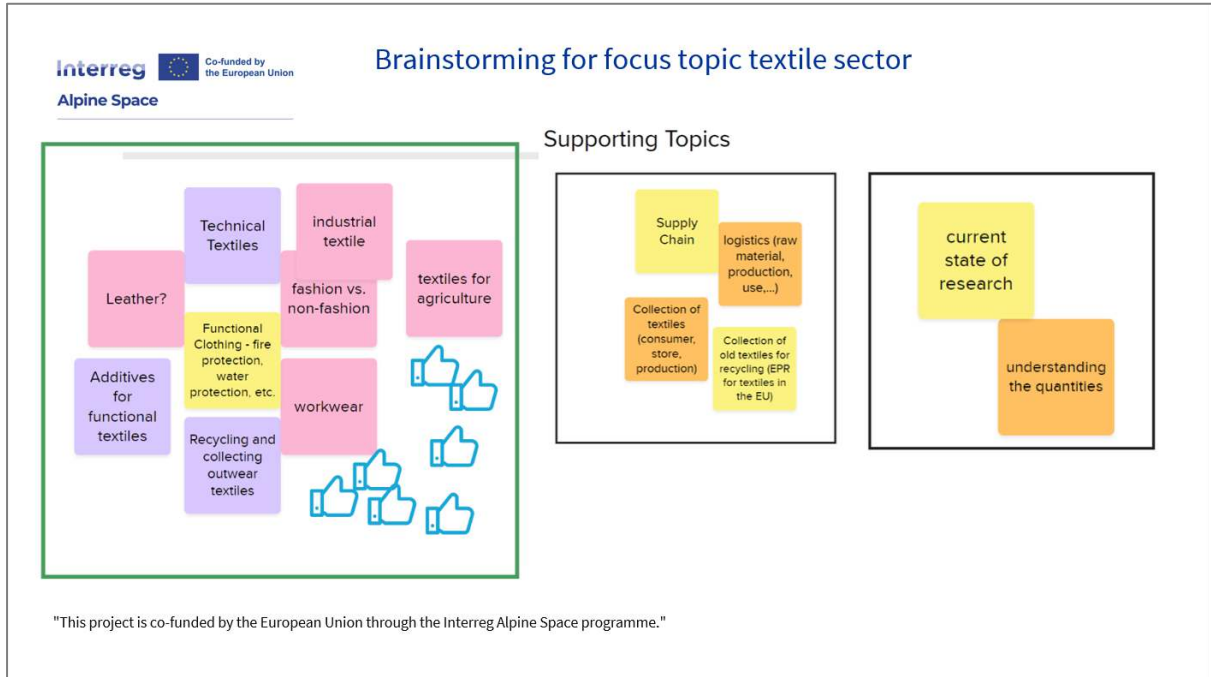
The results of the kick-off meetings were presented during the Cradle-ALP project meeting organized in Linz on the 23rd and 24th of October 2023.

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 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.

GAPS	BARRIERS
- Value chain of end-of-life products is not unified or fully developed - Feedstock for recycling - A lack of adequate infrastructure for textile recycling - Not enough technologies for recycling mixed fibers - Collection and separation - Application of 10R strategy - Sorting of dark textiles - People might not go for more expensive yet sustainable products - Value chain especially extra-EU	- Material mixtures of textiles - Fast fashion - Collection system of H&M and co - Energy demand - Too many different types of textiles and polymers in 1 clothing - Consumer demand for cheap products
DRIVERS	**POTENTIAL**
- Customers want it - Upcoming regulatory affairs - Sustainable fashion start-ups - Material quality - Strong legal incentives (extended producer responsibility)	- Cooperation with R&D + Funding - Long-term use - High potential start-ups - Chemical recycling of clothing - Regional value chain - Supporting local/EU sustainable textile producers - Digital product passports

4.4 External expert support group workshop

- December 20, 2023
- Participants: Christiane Luible-Bär, Ashna Mudaffer and Gamze Ilbeyi

The external expert in the workshop identified several gaps, including the need for automation and digitalization in textile recycling, as well as the ongoing necessity for new fibers despite recycling efforts. Various companies were highlighted involved in waste management and the importance of improving collection methods for textile waste was emphasized. Additionally, the expert stressed the significance of developing automated processes to sort non-textile materials during recycling.

Regarding barriers, the expert discussed the impending decline in cotton farming and the importance of addressing this through new fiber exploration. They also highlighted the need for effective policies and adequate funding, noting the significant impact of product design on sustainability.

Key drivers identified include the Cisutac Project in Sweden, which explores future scenarios for the textile industry, and the proposed shift towards slow fashion and re-shoring for sustainability. However, challenges include balancing sustainability with the demand for fast fashion and offshore production.

In terms of potentials, the expert emphasized the EU's need for independence in fiber production and highlighted the potential of slow fashion and local production in Europe. They also noted the promise of circular design and regional value chains, as well as the opportunities for start-ups in innovative services like repair and remanufacturing.

Vision: 50% of all textiles produced in the EU being made from recycled or renewable materials by 2030

Focus Topic: Our vision for the industrial sector of technical and functional textiles is to revolutionize production processes, achieving circularity by maximizing resource efficiency and minimizing waste, thereby spearheading sustainability and innovation in the industry.

4.5 Organization of the TSWG roadmapping workshops

Once the vision was elaborated, the TSWG decided on the dates and organization of the 3 roadmapping workshops.

- March 13, 2024: Material & Resources
- March 19, 2024: Product design for reusability, recyclability
- March 20, 2024: Recovery: collection, sorting, reuse & recycle

A MURAL template was designed by CCB in order to provide guidelines and roamdpaping exercises to the TSWG, CCB and POL organized a training session the 31rst of January 2024 for all the partners in order to present the template, the exercises and provide guidance in the roadampping methodology. The session was recorded and available on the project internal collaborative tool (Trello).

4.5.1 Workshop 1: Material & Resources

- Title of the meeting: Cradle ALP: Roadmapping workshop – textile/material & resources
- Date: 13th March 2024
- Starting time: 09:30
- Ending time: 12:00
- Duration of the meeting: 2,5 hrs

Challenges (gaps & barriers)

Technologies

- Material mixtures: Developing processes to handle complex material compositions efficiently
- Still many substances of concern used for textiles: Addressing the continued use of harmful chemicals in textile production
- Automated sorting: Transitioning from manual to automated sorting methods to improve efficiency
- Sustainable chemicals: Utilizing environmentally friendly chemicals in textile manufacturing
- Recycling processes with lower input quality requirements: Improving recycling methods to accommodate lower quality input materials
- not clear who and how will textile be recycled even if its made from the recyclable material: Establishing responsibility and processes for recycling textiles made from recyclable materials
- synthetic fibers - it can be recycled endless of times: Encouraging the use of synthetic fibers for their recyclability and longevity
- sourcing sustainable materials: Ensuring the procurement of eco-friendly raw materials
- Quality of the fibre: Maintaining high standards for fiber characteristics in textile production
- separation of various fibre types: Developing techniques to separate various fiber types for recycling
- industry scale fibre to fibre recycling: Creating technologies for large-scale recycling of textile fibers
- Logistics for collection: Addressing the lack of infrastructure for efficient textile collection

Business Models

- Regional value chains needed: In Europe we don't have textile production
- Textiles in loops are more expensive than linear textiles: recycle and reuse materials are costlier because of the additional processes (additional labour, technologies, more resources etc.)
- Impossible to make big investments before clear who will have how many textile to recycle: Hard to make investment because of the unclear legislation
- Less taxes for labour: Keeping textiles in the loop is labour intensive, therefore in the current system economically difficult
- Markets for recycled fibres: There is no market for recycled textiles. Textile waste is cheaper than recycling the fibre
- Increasing the cost of incineration can incentivize recycling efforts

- Environmental impact of production processes: Textile production has a great impact on the environment. Consider external costs when evaluating the process of production of new textiles and recycle or reuse them
- Separate collection of PC (Post Consumer)-Textiles for recycling: Effective separation and recycling methods are necessary for sustainable textile practices
- Separation, recycling
- Considering the 10 Rs: Considering the "10 Rs" principle, focusing on solutions beyond recycling in textile sustainability efforts
- Certifications GOTS (Global Organic Textile Standard): can guide sustainable business practices in the textile industry

Legislation/ Regulations/political frame

- No decision on EPR frame yet: There hasn't been a finalized decision regarding the Extended Producer Responsibility (EPR) framework, which is crucial for holding manufacturers responsible for the end-of-life management of their products
- No ecomodulation yet: Ecomodulation, which involves adjusting fees or taxes based on a product's environmental impact, hasn't been implemented. Without this, there's no direct financial incentive for manufacturers to align their practices with circular textile principles
- Unified EU legislation: There's a need for cohesive legislation across the European Union
- Harmonized EPR systems in Europe: Similar to unified legislation, harmonizing Extended Producer Responsibility (EPR) systems would create a more consistent framework for manufacturers
- effective policies are needed: Beyond legislation, effective policies are necessary to drive sustainable practices in the textile industry, including incentives, penalties, and support mechanisms
- Grants, subsidies for companies that want to transform their business model: Financial support in the form of grants and subsidies can encourage companies to transition to more sustainable business models, such as adopting circular economy principles
- regulatory measures to promote sustainability: Regulations specifically aimed at promoting sustainability in the textile industry are essential for creating a level playing field and driving meaningful change
- Obligation for the use of recycled fibers: Mandating the use of recycled fibers can help stimulate demand for recycled materials and incentivize investment in recycling infrastructure
- overconsumption and throwaway culture: Addressing patterns of overconsumption and a throwaway culture is crucial for reducing the environmental impact of the textile industry
- collection system for textiles: Establishing a comprehensive collection system for used textiles is essential for facilitating recycling and minimizing waste

- Regulations for producers outside EU: Given that a significant portion of textiles are produced outside the EU, regulations addressing environmental and social standards in these regions are important for ensuring global sustainability efforts
- EoL (end of life)-Treatment outside EU: Considering the destination of textiles at the end of their life, especially if they end up as waste in regions with less developed waste management infrastructure like Africa, is necessary for understanding the full lifecycle impact of textiles

Solutions and activities

- Regulatory measures like taxes to promote sustainable clothing: Governments can impose taxes on non-sustainable clothing to incentivize companies and consumers to opt for eco-friendly options, thus promoting sustainability in the textile sector.
- Funding for SMEs: Small and medium enterprises (SMEs) in the textile sector should receive financial support to invest in sustainable practices, technology upgrades, and innovation, fostering their growth and contribution to sustainable development.
- Share good practices: Encouraging the sharing of successful sustainable practices among textile companies can accelerate the adoption of environmentally friendly methods and technologies throughout the industry.
- Invest in second-hand shops: Investing in second-hand shops can encourage consumers to opt for pre-owned clothing, reducing the demand for new textiles and promoting circularity in fashion.
- More media attention: Increasing media coverage, especially on popular platforms like TikTok and Instagram, can raise awareness about sustainable fashion practices and inspire consumers to make more eco-conscious choices.
- Education to facilitate and increase acceptance of sustainable options: Educating consumers about the environmental impact of their clothing choices and promoting the benefits of sustainable textiles can lead to increased adoption of eco-friendly alternatives.
- Fund social economy systems for collection, separation: Investing in social economy systems for the collection and separation of textiles can improve recycling rates and reduce waste in the textile industry.
- Fund projects for digital product passes for textiles: Supporting projects that develop digital product passes for textiles can enhance transparency in the supply chain, enabling consumers to make informed choices about their purchases.
- Grants, subsidies for companies that want to transform their business model: Providing financial incentives such as grants and subsidies can encourage textile companies to transition towards more sustainable business models and practices.
- Make it interesting for the people - good design, good marketing: Emphasizing good design and effective marketing strategies can make sustainable clothing more appealing to consumers, driving demand for eco-friendly fashion.
- Education of people, consumers: Educating consumers about sustainable fashion practices and the environmental impact of their clothing choices can empower them to make more informed and responsible decisions.

- Awareness building: Starting awareness campaigns in educational institutions and through media channels can instill a culture of sustainability from an early age, fostering long-term behavioral change.
- Consciousness-building: Encouraging mindfulness and consciousness about the environmental and social implications of textile consumption can lead to more responsible consumer behavior.
- System change (alternative resource streams): Encouraging the adoption of alternative resource streams, such as recycled materials or renewable energy sources, can promote sustainability and reduce the environmental footprint of the textile industry.
- Funds to start more second-hand shops: Providing financial support to establish new second-hand shops can expand the availability of pre-owned clothing options, contributing to a more circular economy.
- Funding for second-hand shops to make them economically feasible: Supporting second-hand shops financially can help them overcome challenges and become economically viable, ensuring their sustainability in the long run.
- Digital services for second-hand textiles: Developing digital platforms and services for second-hand textiles can enhance convenience for customers, making it easier for them to access and purchase pre-owned clothing items.
- Example of good practice (AQUAFIL): Highlighting successful case studies like AQUAFIL
- Automated sorting: Implementing automated sorting technologies can improve efficiency and accuracy in textile recycling processes, facilitating the recycling of different materials and reducing waste.
- Different materials make sorting complex: The diverse range of materials used in textiles presents challenges for recycling processes, emphasizing the need for innovative solutions and technologies to address these complexities.
- Rethink design & develop the material: Encouraging designers to rethink traditional approaches and develop materials that are more sustainable and easier to recycle can contribute to reducing the environmental impact of textile production.
- Find solutions not only in EU, also outside the EU: Collaborating with international partners, including countries like Bangladesh where the textile industry is significant, can foster global cooperation and innovation in sustainable fashion practices.

Timeframe

In the voting results, regulatory measures like taxes to promote sustainable clothing received the most votes, highlighting the importance of government intervention to incentivize eco-friendly choices in the textile sector. Following closely were suggestions to find solutions both within and outside the EU, emphasizing global collaboration for sustainable fashion practices. Additionally, proposals for automated sorting technologies, funding for digital product passes, sharing good practices, and focusing on attractive design and marketing strategies garnered significant support, reflecting a multifaceted approach to achieving sustainability goals in the textile industry.

4.5.2 Workshop 2: Product design for reusability, recyclability

- Title of the meeting Cradle ALP: Roadmapping workshop – textile/material & resources
- Date: 19th March 2024
- Starting time: 13:00
- Ending time: 15:00
- Duration of the meeting: 2 hrs

Challenges (Gaps and barriers)

Technologies

- mixed materials in textiles, technologies to use mixed fibres efficiently.
- Search for technologies to use textile waste again, industrial processes to produce recycled fibres.
- For reuse: use of long-lasting materials, focus on the durability of the textiles: more testing before production to be able to reuse.

- High-quality materials: Using durable, high-quality materials such as organic cotton, recycled polyester, or linen can help increase the durability of garments and promote their reusability. The quality of the products is very important - the quality has an impact on the whole recycling process. The better the raw material, the better it can be recycled and brought into a new cycle. The same applies to the processing of materials. Heavily treated textiles (washing, bleaching, dyeing, etc.) are more difficult to recycle and therefore more difficult to integrate into a new cycle.
- Loss of know-how in textile industry (repair)
- Need to reduce the use of elastane or to find alternatives, encourage the textile-to-textile recycling instead of using plastic bottles to make rPET.
- Technology for sorting reusable textiles: Mixed views: Technology for textile sorting available, but there is currently a lack of many textile recycling companies - maybe one step back to other sectors (paper, ...) Not enough capacities to recycle - Maybe attributable to lack of technologies.
- BUT: topic needs to be included in designing process to simplify recycling and increase output & quality -> separation: biodegradable materials/ synthetic materials
- Modular Design: garments should be designed to be easily disassembled and repaired, enabling consumers to replace faulty parts or customize clothing instead of discarding them.
- Recycling and Upcycling: Designing with the intention of reusing or transforming garments after their original purpose. This could involve recycling old garments into new designs or using materials from other sources such as vintage fabrics or post-consumer waste. On the other hand, functional clothing hard to recycle - for example fire- or heat-repellent functional clothing. These are made from a large mix of materials.
- Fast fashion: Do we need fast fashion? and: Do we need mixed fibers? The use of mono-materials could be a first big step towards achieving better recycling.

Business Models

- Not much research yet on use of recycled fibre in clothes, recycled fibre more expensive than primary materials, problems for business models: prices are higher compared to e.g. rec. PET products.
- Hight efforts in explaining the differences to customers needed, education of the consumers - presenting them positive aspects of recycled textiles.
- Current end of live scenario for textiles, not enough capacities yet to recycle textiles.
- Changes in supply chain - logistics, suppliers etc.
- Offering businesses easy options (closed loop textiles)- one stop shop
- More exchange between designers and recyclers, not enough designers are aware of how to design for circularity.
- Lack of sharing (in view of recycling textiles)
- Business models which would include repair and reuse (example of Patagonia)
- Collection schemes for textile waste collection, problems for brands: amount of recyclable goods returned versus amount needed for development process of e.g. yarns.

- Costs of new vs. the recycled fibres: We must motivate companies and costumers to use/war recycled clothes and fibres.
- Information flow must function - possible activity: product passport must be introduced = this provides collected information along the entire supply chain.

Legislation

- no mandatory targets for use of recycled fibre, legislation should be implemented to support recycled materials.
- not enough financial support for new design, business development (cost of virgin material)
- (consumer) pricing: new materials are much cheaper; this is seen as a decisive factor. Regulations should be developed to improve pricing.
- Incentives and regulations: On the one hand, companies should be motivated to act more circularly through incentives. On the other hand, consumers are also very important and should also be educated and their awareness raised. But: what financial incentives are needed?
- more decision-making support for textile companies
- Lack of traceability

Solutions and activities

- Best practice collection of global and local textile collection: for reuse and repurpose of textiles. E.g.: University of Arts in Linz
- Scenario analysis study
- Value Chains and consideration of social impacts of production changes: localized value chains to increase production standards.
- Collection near the customer: to make collection easier and more consistent.
- Circular design could/should be a big step forward in the waste industry. Collaboration of the value chain is required: designers and recyclers should work together. Get designers and recyclers in the same room, include the waste industry in the efforts. The waste management industry in europe should be a pioneer in this area and set an example.
- More transparency on decision making and value chains in the sector how are purchasing decisions made, how is production handled in detail
- Green washing and transparency: green washing is still often recognizable and should no longer be accepted. One possible activity could be: Implementation of transparency in the entire supply chain - e.g. by implementing the planned supply chain law. The identified (company) results could be incorporated into communication work in a "green washing-free" manner.
- Good examples that are not "green washing" are already suffering from this. There are already (very) good solutions, but in many cases, they are still underrepresented or

simply unknown. It is precisely for this reason that green washing should be reduced to make genuinely circular economy work recognizable.

- Education and awareness-raising: Education should start earlier, one in school, as well as earlier: the young generation are the consumers of the future. However, the responsibility must not just be placed on consumers; all stakeholders are called upon to act: Regulation, brands, designers, the market, ... the whole society.
- Repair Bonus: Extend the repair bonus to textiles to encourage reuse and repair of textiles.
- Digital Product Passport: adjust current plans to increase usefulness.
- Financial incentives: more financial funding specific to the sector
- Integrate the textile sector into strategic programs: as a baseline for funding calls
- Education to combat fast fashion and reduce the amount of textile waste before it is even consumed (refuse)

Timeframe
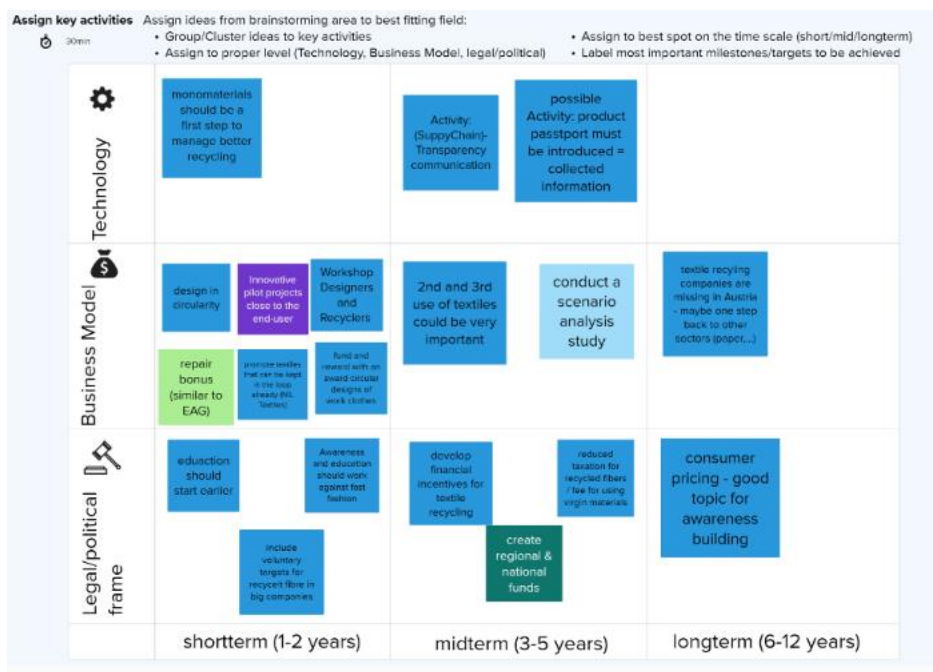
Due to the low number of participants that were able to stay until the very end (when the voting would have been due), the decision was made to end the workshop here and not conduct the voting with the limited number of participants left.

4.5.3 Workshop 3: Recovery: collection, sorting, reuse & recycle

- Title of the meeting Cradle ALP: Roadmapping workshop – textile/material & resources
- Date: 20th March 2024
- Starting time: 09:30
- Ending time: 11:30

- Duration of the meeting: 2 hrs

Challenges (Gaps and Barriers)

Technologies

- Automated sorting for recycling
- Automated sorting for multi layers textiles
- Too much elastane in textiles
- Detection of trims and other hard components
- Wide variety of textile waste
- the combination of varous fabrics makes technical sorting difficult
- different origins of secondary material (factories, shops, consumers)
- separation of fibre mixtures
- recycling technologies --> x-to-fibre
- Recycling of production/cutting waste
- Recyling of textile waste - End of Life
- Fiber2Fiber Recycling
- Design4Circularity
- Stop using plastic bottles to make rPET

Business Models

- Separate collection of textiles for recycling
- the current sorting companies focus on second hand. and would need to reinvent
- local businesses and value streams
- lack of business models focusing on closing the loop
- Collaboration across the entire value chain
- return system (a buyer can give textiles back- to the seller)

Legislation/regulation/political frame

- Full cost coverage for textile recycling
- control of value-chains
- there schould be a stop of exporting post-consumer waste
- mandatory "design for circularity"
- Waste industry for textiles like paper or plastic

Solutions and activities

- subsidies for closing the loop
- make processes cheap!
- research funding
- Regulations preventing the use of too many different materials in a textile
- Facilitate recycling

- Regulations preventing the use of plastic bottles and focus on fiber to fiber recycling
- provide a solutions how the "CSDDD" can really work out to be successful... (I know, that is not really a solution right now, but another challenge... :-)
- incentives for reused and recycled textiles
- make sorted high-quality collection EASY to use for the people
- the combination of varous fabrics makes technical sorting difficult
- mandatory "design for circularity"
- use textile with less mixed fibres
- Educate consumers about the textile value chain
- strongly focus public awareness
- Promote good quality textiles and make fast fashion less attractive
- ban "fast fashion"
- build up logistics for collection
- true costs for imported and for low-quality products. It has to be cheaper to buy good local quality than bad imported stuff.
- Facilitate the logistic between the collection and the sorting facilities
- Facilitate logistic between sorting and recycling facilities
- more option for textiles without buying them
- waste industry is missing --> we need waste industry for textile
- we need regulations for recycling textiles
- mono material but not for technical clothing
- mono material for fashion items
- share good practices
- more research on biobased fibres
- build up logistics for collection
- recycling partner --> companies not the producer itself, e.g. plastic bottles
- build up logistics for collection
- CSDDD / "supply chain law" regulations on national basis
- find partners for recycling -> mixed materials!!!
- education and awareness building for children & adult

Timeframe
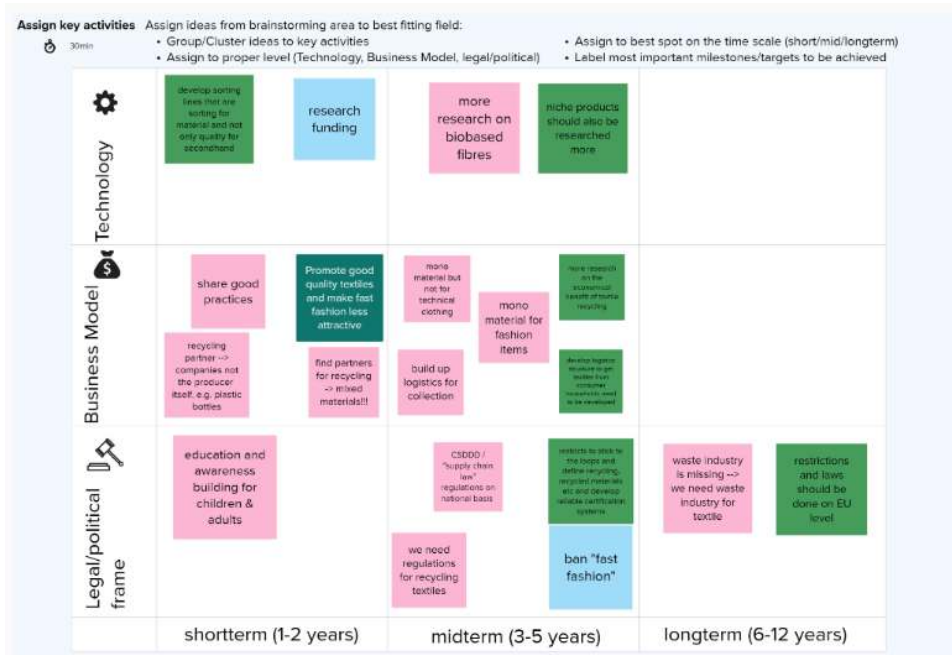
Due to the low number of participants that were able to stay until the very end (when the voting would have been due), the decision was made to end the workshop here and not conduct the voting with the limited number of participants left.

4. Conclusion

Lessons learned/recommendation on the roadmapping process based on the roadmapping workshops organised.

Please describe the good practices and the activities that worked but also the difficulties you have encountered in the different aspects of the roadmapping process:

Organisation of the workshops (invitations, tools used)

In consultation with those responsible for the other workshops, 3 dates were determined that did not overlap with the other workshops. An official invitation was created, which was sent to many contacts. Similarly, Business Upper Austria's corporate communications department generated a website entry for each workshop, which made it possible to provide information and register.

MS Teams was used as a discussion tool. Mural was used as a participative workshop tool.

Preparation and moderation

PP5 Business Upper Austria was primarily responsible for the "Textiles" sector. Due to the internal group size, the moderation and all other organizational roles could be taken over by

the project team. Katharina Perfahl acted as the main moderator for all three workshops. She led through the workshops, presented the project and the main and sub-goals as well as the vision, provided information on the respective procedures and rules of the workshops and summarized the results. Gamze Ilbeyi, Melanie Eggel and Christian Teufel co-moderated, led individual breakout sessions, summarized group results and/or acted as timekeepers, note-takers and technical supporters.

Generally speaking, preparation for the textile workshops was not as extensive due to the similarities between the setting of the textiles and chemistry workshops. As the decision was made to apply a concept as similar as possible to enable better comparison afterwards, a lot of preparatory work was already done through the support of Chemistry Cluster Bavaria during their workshops, providing a guideline for how the textile workshops were then approached.

As mentioned earlier, Mural was used as a workshop tool. The respective Mural boards were also based on the suggested final concept of the chemistry group. A learning here was the need to familiarize oneself with these tools well enough in advance. Mural is not a tool commonly used within Business Upper Austria; therefore, the team was unaware of the functionalities limited to the paid plan until briefly before the first workshop. Next time, this would surely be something checked further in advance.

Participation from the audience

There were at least 8 and up to 13 guests at each workshop. These workshops were accompanied by the Business Upper Austria team members.

At the start of the workshop, interactive introductions were held in which all guests and participants introduced themselves and actively learned how to use the mural board.

After the collection of topics and the joint classification into "Technologies", "Business Models" & "Legislation/ Regulations/political frame", the guests were split into small groups. Workshop 1 "Material & Ressources" was limited to one discussion group due to the size of the group. During the joint pre-selection of topics and the individual breakout sessions, there were lively discussions and intensive interaction between all participants.

In order to increase participation, the workshop moderators encouraged participants to turn on their cameras during the discussions and tried to address particularly silent people directly. The decision to work with breakout groups was made after an increase in participation was seen during the chemistry workshops when the switch from one large group to breakout groups was made there.

Results, Outputs and solutions

The transformation to a textile economy in the sense of the circular economy is a major challenge and requires the involvement of all relevant actors - from the government as well as from society, science and business.

The workshops identified numerous challenges within the textile sector. In terms of technology, there's a need for advanced sorting systems, especially for multi-layer textiles, alongside difficulties posed by excessive elastane and the detection of hard components. Sorting complexities arise from the wide array of textile waste and fibre mixtures, further complicated by challenges in separating them. Solutions include exploring innovative recycling technologies and embracing design strategies for circularity.

Regarding business models, challenges include establishing separate collection systems for textile recycling and reevaluating the focus of existing sorting companies, which predominantly target the second-hand market. The development of local businesses and value streams is essential, along with the formulation of effective business models that support circularity. Additionally, implementing return systems where buyers can return textiles to sellers could facilitate recycling efforts.

In terms of legislation and regulation, there's a call for full cost coverage for textile recycling to incentivize proper waste management practices. Controlling value chains and ceasing the export of post-consumer waste are deemed crucial measures. Moreover, demanding mandatory "design for circularity" regulations and establishing a dedicated waste industry for textiles could streamline recycling processes and regulations, thereby promoting sustainability within the sector.

During the workshops, various actions were identified as necessary measures to address challenges in the textile industry. These include establishing a waste industry dedicated to textiles to streamline recycling processes and ensure proper waste management. Additionally, there is a call for implementing regulations specifically focused on recycling textiles to enhance accountability and sustainability in the industry. It was suggested to promote the use of mono-materials, particularly for fashion items, to facilitate recycling processes while considering exceptions for technical clothing. Sharing best practices within the industry is seen as essential to encourage adoption of sustainable approaches across the board. Moreover, increasing research efforts on biobased fibers to explore more sustainable alternatives to traditional materials is recommended. Developing robust logistics infrastructure for efficient collection of textile waste is crucial, along with partnering with recycling companies separate from producers to handle recycling processes effectively, similar to existing arrangements for materials like plastic bottles. Enforcing regulations such as "CSDDD" or "supply chain law" at a national level to ensure compliance and accountability throughout the supply chain.

Implementation of subsidies to incentivize closing the loop in textile production, emphasizing cost-effectiveness in processes, and allocating research funding for innovative recycling technologies. Additionally, regulations limiting the use of multiple materials in textiles can streamline recycling processes, while measures facilitating recycling and promoting fiber-to-fiber recycling over the use of plastic bottles are crucial.

There's a need to explore effective strategies to ensure the success of initiatives like "CSDDD" and introduce incentives for the reuse and recycling of textiles. Simplifying the process for high-quality collection can encourage public participation, alongside promoting mandatory "design for circularity" guidelines and utilizing textiles with fewer mixed fibers to enhance recyclability.

Education campaigns aimed at informing consumers about the textile value chain and heightened public awareness campaigns focusing on sustainable textile consumption are essential. Moreover, promoting high-quality textiles to reduce the appeal of fast fashion and advocating for banning fast fashion practices are crucial steps forward.

Establishing logistics infrastructure for efficient textile collection, imposing true costs for imported and low-quality products, and improving logistics between collection and sorting facilities are necessary. Finally, expanding options for accessing textiles without purchasing them directly can further contribute to sustainable practices in the textile industry.