

DEFINITION STUDY OF THE CATALAN CIRCULAR HUB MODEL

TEX-R-HUB PROJECT: RECYCLING HUB FOR TECHNICAL-USE TEXTILES IN CATALONIA



Study prepared for:



With the support of:



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1. THE PROJECT

This study is part of the [TEX-r-HUB](#) project, whose objective is to develop a sectoral study to promote the circular economy in the advanced textile materials sector in Catalonia, connecting the different companies within the ecosystem in order to facilitate circularity in the sector.

To achieve this objective, the project has carried out a series of actions:

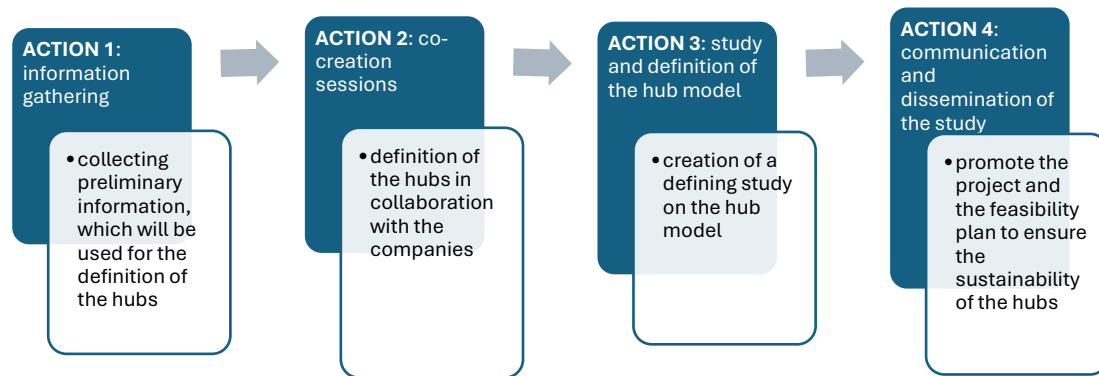


Figure 1. Actions of the project.

This document is the result of Action 3: Study and definition of the circular hub model.

The project aims to bring improvements to the advanced textile materials sector in Catalonia, which is primarily composed of SMEs, by generating new opportunities for them to contribute to reducing the sector's environmental impact. Likewise, it will also have a positive impact on fashion and home companies, which could benefit from new recycled products as well as from the pilot experience.

2.THE PROMOTERS: Tèxtils.CAT

TEX-r-HUB is driven by [Tèxtils.CAT](#), a cluster with extensive expertise in the textile field that brings together Catalan companies and organizations directly or indirectly linked to the advanced textile materials sector, forming a specialized production hub with competitive advantages.

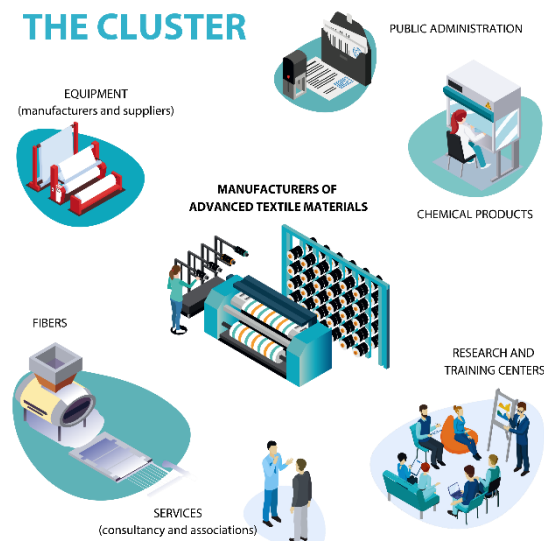


Figure 2. Structure of the cluster.

Tèxtils.CAT's main objectives are to promote R&D&I, especially through cooperation; to foster collaboration at all levels within the Catalan advanced textile materials sector; and to promote the cluster and its members internationally.

The cluster and its companies have participated in numerous sustainability-related projects, demonstrating their commitment to driving innovation in the sector in this regard.

3.OBJECTIVE OF THE STUDY AND METHODOLOGY

The objective of TEX-r-HUB was to develop a sectoral study to promote the circular economy in the advanced textile materials sector in Catalonia, connecting the various companies within the ecosystem to facilitate sector circularity and the creation of a circular hub.

The project carried out several actions focused on collecting the data necessary to develop the circular hub. This information was obtained through desk research using the data available to Tèxtils.CAT, compiling results from previous projects, and also consulting companies directly when sufficient information was not available.



Figure 3. Working session with the cluster members.

4. ADVANCED TEXTILE MATERIALS IN CATALONIA AND ASSOCIATED WASTE

4.1. Textile waste in Catalonia

In Catalonia, each person consumes between 21.5 and 26 kg of clothing per year, yet only 12% of textile waste is collected separately, a percentage far below that of other waste fractions. This means that the vast majority of post-consumer textile waste is either incinerated or sent to a landfill, representing a loss of many resources that could have been maintained or reintroduced into the production system.

However, because the most visible side of textiles is fashion—due to its connection with the general public and the resulting high sales volumes—information related to textiles usually focuses on this subsector and on post-consumer waste, that is, waste generated after the use of garments, once they reach the end of their life cycle and require final disposal.

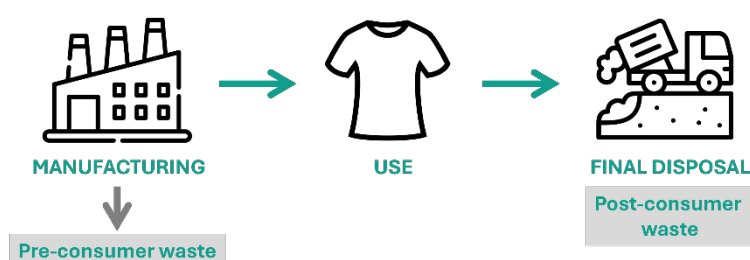


Figure 4. Pre- and post-consumer waste.

According to Idescat, in 2023 there were **4,366** companies in Catalonia within the textile, leather, footwear, and garment manufacturing industry¹. In the whole of Spain, the total number of companies is 16,964², with 25% of them located in Catalonia.

The advanced textile materials sector also generates waste that should be included in the textile industry figures, even though its end users are different from those of fashion textiles. Advanced textile materials serve not only an aesthetic function, which makes the product characteristics different.

Pre-consumer waste from advanced textile materials industries is similar in form to that of the fashion textile industry: cut edges from looms, pieces or scraps discarded during quality control, etc. However, they can be distinguished in two main aspects: either they come from different operations, some of which are not commonly found in the fashion world (laminates, etc.), or the fabrics are made of raw materials not typical in fashion (for example, flame-retardant materials such as modacrylic, etc.).

These are some of the most common forms that textile waste takes³:

- **Selvages:** These are the lateral edges of the fabric that are cut during the manufacturing process.
- **Fabrics used and/or discarded during quality control:** Pieces or parts of fabric that do not meet quality standards and are rejected.
- **Leftover scraps from cutting/punching processes:** Parts of fabric that remain after cutting pieces into the desired shape.
- **Samples:** Small portions of fabric used for testing or to show clients.
- **Yarn remnants:** Leftover yarn generated during production.
- **Process residues:** lint, laminates, etc.: Other types of waste specific to certain manufacturing processes, such as lint generated during carding or waste from laminates.

¹ <https://www.idescat.cat/industria/ei?tc=1&se=215>

² https://www.idepa.es/detalle-cpi/-/asset_publisher/zxT81Eepo2hu/content/sector-textil-el-sector-en-espana-informacion-general

³ <https://circular.textils.cat/>



Figure 5. Most common forms of textile waste.

4.2. Sustainability projects

Both Tèxtils.CAT and its associated companies have been actively working on sustainability-related projects for years. Some of these are detailed below:

4.2.1. Cluster initiatives

Cluster initiatives on general topics of interest for the textile sector when implementing the circular model:

4.2.1.1. Recycling and circularity process

Name	CIRCULAR.TÈXTILS.CAT	
Description	Sectoral analysis to identify the barriers the sector faces in implementing actions that promote the circular economy (CE), as well as to identify specific CE actions applicable to the technical textiles sector to facilitate their implementation in these companies.	
Tèxtils.CAT involvement	Coordinated jointly with FITEX and with the collaboration of Leitat Technological Center .	
Duration	September 2021 – April 2023	
Programme	Projects promoting the circular economy, Catalan Waste Agency	



Connection with TEX-r-HUB:

- Practical examples of circular economy applied to the sector
- Circular marketplace

Name	CIRCULARTech 
Description	Anàlisi sectorial que identifica quines són les barreres del sector per poder implantar accions que fomentin l'EC. També, identificar accions concretes d'EC aplicables a l'especificitat del sector de tèxtils tècnics per tal de facilitar la seva implantació a les empreses del sector.
Tèxtils.CAT involvement	Coordination, in collaboration with Leitat Technological Center .
Duration	January 2020 – March 2021
Programme	Projects promoting the circular economy, Catalan Waste Agency

Connection with TEX-r-HUB:

- Information on the level of knowledge of companies regarding CE.
- List of sector initiatives, as examples.

Name	TEXSOSPACK 
Description	Study to promote the implementation of sustainable packaging in the advanced textile materials sector. Identification of available options on the market, as well as the main challenges faced by companies in the textile sector in this area, conducting an analysis of possible solutions and their environmental impact.
Tèxtils.CAT involvement	Coordinated jointly with Packaging Cluster .
Duration	September 2021 – April 2023
Programme	Projects promoting the circular economy, Catalan Waste Agency

Connection with TEX-r-HUB:

- Information related to packaging in advanced textile materials companies.

Name	REGIOGREENTEX 
Description	The project aims to map gaps and weaknesses between regions and to mitigate the obstacles that currently exist in implementing a systematic circular economy model in the European textile industry.
Tèxtils.CAT involvement	Member. Consortium led by EURATEX (Belgium).
Duration	January 2023 – December 2025
Programme	Interregional Innovation Investments Instrument (I3)

Connection with TEX-r-HUB:

- Definition of the challenges the sector faces when applying the circular economy.

Name	SUSTAINTEX 
Description	SUSTAINTEX aims to create a roadmap for the application of circular economy and eco-design in the textile sector, facilitating the adoption of sustainable economic models in the textile industry through initiatives such as the development of an open virtual course on circular economy and sustainable textiles, among others.
Tèxtils.CAT involvement	Member. Consortium led by Bogazici University (Turkey).
Duration	December 2023 – June 2025
Programme	Erasmus+ Strategic Partnerships

Connection with TEX-r-HUB:

- Definition of the challenges the sector faces when applying the circular economy.
- Resources are created for the industry.

Name	IN TRANSIT 
Description	In Transit aims to promote the resilience of SMEs in the textile, aerospace, and construction sectors by transforming them into greener and more digital industries through a new social and business model. The project also aims to support the main objectives of the European Green Deal and the EU SME Strategy.
Tèxtils.CAT involvement	Member. Consortium led by ATEVAL (Valencia, Spain).
Duration	December 2022 – November 2025
Programme	Horizon Europe

Connection with TEX-r-HUB:

- Support to companies' projects through different mechanisms.

Name	TEX-BREIN 
Description	TEX-BREIN aims to build and strengthen innovative and resilient value chains and to support the circular transition of European textile communities, fostering interregional collaboration among different quadruple helix actors and supporting skills development and the uptake of circular textile solutions in less developed regions.
Tèxtils.CAT involvement	Member.
Duration	November 2024 – October 2026
Programme	Interregional Innovation Investments Instrument (I3)

Connection with TEX-r-HUB:

- Interregional training activities.
- Capacity building to identify, select, and develop investment pilots in cooperation with other regions.

4.2.1.2. Training

Name	ADDTEX 
Description	ADDTEX aims to bring together companies, clusters, higher education institutions (HEIs), and vocational education and training (VET) providers in the technical textiles sector to work collaboratively, promoting cooperation and fostering digital and green skills as a shared objective.
Tèxtils.CAT involvement	Coordination. Consortium made up of 12 members.
Duration	July 2022 – June 2025
Programme	Erasmus+ Strategic Partnerships

Connection with TEX-r-HUB:

- Training to foster the circular economy.

Name	CLEANTEX 
Description	CLEANTEX aims to promote the adoption of circular economy and eco-design to enhance the skills of textile engineering students and industry workers through intersectoral cooperation at higher education institutions.
Tèxtils.CAT involvement	Member. Led by Kaunas University of Technology (Lithuania).
Duration	November 2022 – January 2023
Programme	Erasmus+ Strategic Partnerships

Connection with TEX-r-HUB:

- Training to foster the circular economy.

4.2.1.3. Sustainable materials/products

Name	SUSTEX 
Description	SUSTEX aims to promote the substitution of hazardous chemicals in the Catalan textile industry so that it can incorporate environmental criteria into the manufacturing of its products, through a preliminary study of the current situation in Catalonia.
Tèxtils.CAT involvement	Coordination, in collaboration with Leitat Technological Center .
Duration	January 2020 – October 2021
Programme	Projects promoting the circular economy, Catalan Waste Agency

Connection with TEX-r-HUB:

- Information related to the chemicals present in textiles, taking into account that the circular economy (CE) has a holistic view of the product.

Name	ZEROF 
Description	ZEROF aims to develop safe and sustainable coating products to replace compounds containing fluorinated substances (PFAS), both in the packaging and textile sectors, with an environmental impact improvement goal of more than 25%. Once the products are developed, data will be analyzed to calculate environmental impacts and toxicology, and the certification and regulatory roadmap will be developed to identify future regulatory needs and knowledge gaps.
Tèxtils.CAT involvement	Member. Consortium led by VTI (Finland).
Duration	January 2023 – December 2025
Programme	Horizon Europe

Connection with TEX-r-HUB:

- Information related to the chemicals present in textiles, taking into account that the circular economy (CE) has a holistic view of the product.

Name	MIDWOR 
Description	Analysis of the environmental impact of the best available technologies and alternatives to DWORs (liquid repellents) used in textile finishing processes, especially those containing fluorinated compounds. Detect the best alternatives: those that are the least toxic and have the lowest environmental impact while simultaneously maintaining the required properties of the fabric.
Tèxtils.CAT involvement	Coordinator. Consortium made up of 6 members.
Duration	September 2015 – August 2018
Programme	LIFE

Connection with TEX-r-HUB:

- Information related to the chemical products present in textiles, specifically liquid-repellent finishes.

Name	FLAREX 
Description	The objective of the project is to conduct an analysis of the environmental and toxicological impact of the best currently available technologies that serve as alternatives to toxic flame retardants used in textile finishing processes, especially those containing halogenated compounds, and to demonstrate which are the best alternatives: those that are the least toxic and have the lowest environmental impact while simultaneously maintaining the required properties of the fabric.
Tèxtils.CAT involvement	Coordinator. Consortium made up of 7 members.
Duration	July 2017 – June 2020
Programme	LIFE

Connection with TEX-r-HUB:

- Information related to the chemical products present in textiles, specifically flame-retardant finishes.

4.2.2. Cluster companies' projects

Approximately 50% of the cluster's companies state that they have carried out a project in their company related to the circular economy in the last 5 years. Company projects generally focus on improving the sustainability characteristics of their products or incorporating new ones. These projects are carried out with the company's own funding or with external funding. Some of these projects are listed below:

Name	BIBIO	
Company	HILATURAS ARNAU	
Description	Manufacturing of biodegradable yarns by mixing environmentally friendly materials.	
Duration	January 2020 – September 2021	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	FOCREFIL	
Company	TECHNITIGER	
Description	Design and manufacturing of protective fabrics containing recycled fiber from used garments.	
Duration	January 2020 – December 2021	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	MAROGI	
Company	ETISILK	
Description	Design and manufacturing of baby activity mats using almost exclusively recycled products: discarded fabric due to the presence of defects and unused yarn from the warping process (for the padding).	
Duration	January 2020 – December 2021	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	GREEN-PROTECH	
Company	CP ALUART	
Description	Ecodesign of fabrics for personal protection.	
Duration	May 2021 – April 2023	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	UP-COTTON	
Company	HILATURAS ARNAU	
Description	New applications for cotton textile waste.	
Duration	May 2021 – May 2023	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	ECO-PP	
Company	POLISILK	
Description	Development of PP multifilament yarn using recycled raw material.	
Duration	June 2021 – June 2022	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	SUSTAINABLE HANDLE CORDS	
Company	La Industrial Algodonera - LIASA	
Description	Ecodesign of cords for handles.	
Duration	May 2021- April 2023	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	TEXTUB	
Company	E.CIMA	
Description	Manufacturing of packaging material from the company's own textile waste.	
Duration	December 2023 – February 2025	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	FILTRECYCLE	
Company	FINSA	
Description	Development of technical filter fabrics containing recycled material.	
Duration	December 2023 – February 2025	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	UP-FLOCK	
Company	VELUTEX FLOCK	
Description	Ecodesign of recycled flock by utilizing microfibers.	
Duration	December 2023 – February 2025	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	ECOGLASS	
Company	GLASSCOM	
Description	Ecodesign of composite materials with low-impact fibers to replace glass fiber.	
Duration	December 2023 – February 2025	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	CIRCULAR-REFIL	
Company	TECHNITIGER	
Description	Ecodesign of technical fabric recycling cycles.	
Duration	December 2023 – February 2025	
Programme	Projects promoting the circular economy, Catalan Waste Agency	

Name	LIFE-CIRTECHTEX	
Company	MARINA TEXTIL	
Description	Implementation of circular economy to drastically reduce the generation of technical textile waste and recycle it into high-quality PPE fabrics.	
Duration	June 2023 – May 2026	
Programme	LIFE	

Name	REINTRODUCTION OF TEXTILE WASTE INTO THE PRODUCTION PROCESS	
Company	<u>PONT AURELL Y ARMENGOL</u>	
Description	Return to Pont Aurell y Armengol, by the client, of shredded non-woven fabric scraps leftover after preforming and cutting the manufactured part. At Pont Aurell y Armengol, these shredded materials are reintroduced into the manufacturing process as filler between two layers of non-woven fabric.	
Duration	-	
Programme	Project without external funding	

Name	RECYWASTEX	
Company	<u>UPC</u>	UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH
Description	The general objective of this project is to develop a new recycling process to recover, from textile waste at municipal solid waste sorting plants, the maximum possible amount of high-quality secondary textile raw material with the minimum environmental impact.	
Duration	2022-2024	
Programme	State Research Agency of the Ministry of Science, Innovation and Universities	

Name	RE-HITECHTEX	
Company	<u>HILATURAS ARNAU</u>	
Description	Re-hitechtex introduces a circular economy business model for high-tech garments, such as firefighter suits, combining innovation and sustainability to achieve durable and eco-friendly protective clothing.	
Programme	In Transit	

Name	REFIBER4WORK	
Company	<u>TECHNITIGER</u>	
Description	ReFiber4work remodels workwear using AI-based designs, digital traceability, and sustainable materials, promoting the circular economy and reducing environmental impact.	
Programme	In Transit	

Name	NATURALOUDTORSRUGS	
Company	<u>TEXSILK</u>	
Description	Through the use of recycled polypropylene yarns and texturing techniques, carpets are produced that resist weathering and chlorine, and are UV-resistant. The carpets are soft, designed for walking barefoot, yet simultaneously durable and protective of outdoor furniture. To manufacture them, 50% recycled PP multifilaments are used, resulting in outdoor woven carpets with the lowest carbon footprint in their category.	
Programme	xBUILD-EU	

Name	RECYCLEDPPYARN	
Company	POLISILK	
Description	Manufacturing of polypropylene multifilament yarns with 50% recycled polypropylene. By replacing 50% of virgin material with recycled polypropylene, the environmental impact is significantly reduced without compromising quality. The recycled polypropylene comes from post-consumer plastic waste originated in Spain. This project successfully overcomes the technical challenges posed by the industry for producing recycled yarns.	
Programme	EuroBoosTex	

Name	ECODYE	
Company	TINT FINISH	
Description	The main technological challenge of this project is to research and develop the application of various natural dyes, as well as their mordants, and to optimize their operating conditions in order to present an innovative product to the market. The result is a durable color fixation without damaging the fibers.	
Programme	EuroBoosTex	

Name	MULTICOLOR	
Company	TORNÉ GRUP	
Description	Recycling of multi-colored fabric waste from the fashion sector.	
Programme	In Transit	

Name	SCARABAT	
Company	MANUFACTURAS ARPE	
Description	Recycling of microplastics to create new products.	
Programme	Green technological innovation projects of the Agency for Business Competitiveness of the Generalitat de Catalunya (ACCIÓ).	

Name	SLCORDS	
Company	La Industrial Algodonera - LIASA	
Description	Sustainable cords for paper bags.	
Programme	xBUILD-EU	

Name	ECOTRACK FIBERS	
Company	RETEXCYCLE and TRITURATS LA CANYA	
Description	Traceability system for recycling fibers.	
Programme	EuroBoosTEX	

Name	BIOPREPEG	
Company	TEXTFIRE	
Description	Design of biodegradable thermoplastic prepreg.	
Programme	EuroBoosTEX	

Name	ECOFILTER	
Company	FINSA	
Description	Transformation of manufacturing waste into recycled materials for filtration products.	
Programme	In Transit	

Name	WOOLWALLS	
Company	RUTEX	
Description	Transformation of wool waste into panels for the construction sector.	
Programme	In Transit	

Name	ECO-SPIN	
Company	DÚCTEL	
Description	Digital solutions that make air-textured yarn production more sustainable.	
Programme	In Transit	

Name	CLEANCOAT	
Company	ROSICH Y PUIGDENGOLAS	
Description	Separation of waste from the elastomer coating mixture.	
Programme	In Transit	

5. CLASSIFICATION AND QUANTIFICATION OF PRE-CONSUMER WASTE FROM CATALAN COMPANIES PRODUCING ADVANCED TEXTILE MATERIALS

5.1. Advanced textile materials companies in Catalonia

To get an approximate idea of the current landscape of advanced textile materials in Catalonia, a mapping of the cluster's companies is carried out, categorized according to their position in the value chain. This information will allow for an estimation of the volume of waste generated, its nature, origin, etc.

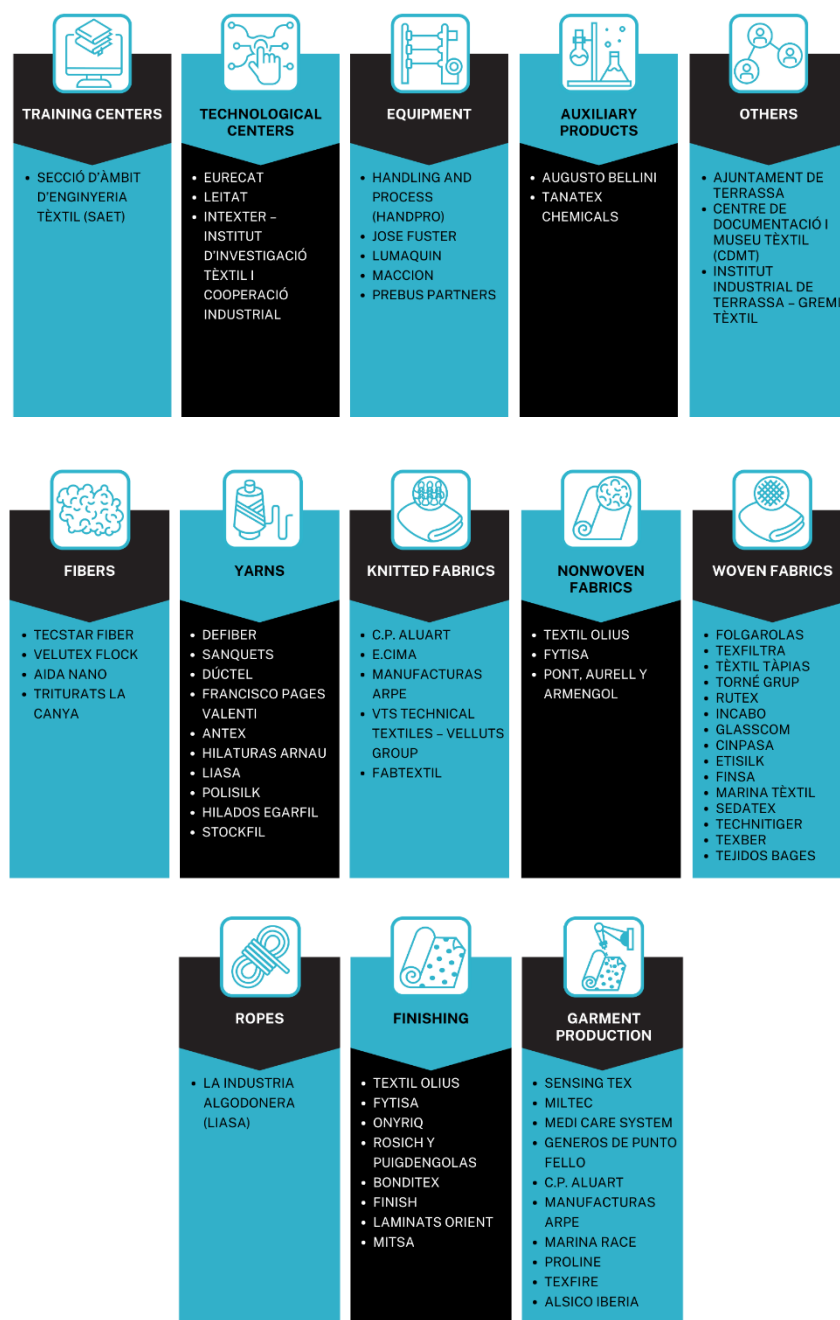


Figure 6. Mapping of cluster's companies.

5.2. General situation and quantification of textile waste in Catalonia

Catalonia generates approximately 21.5 kg of textile waste per capita annually, notably higher than the EU average⁴. Critically, the selective collection rate remains at only 11-12%, well below EU averages and the levels required by the upcoming 2025 mandate. Although selective collection halves the carbon footprint compared to landfilling or incineration (207 vs. 353 kg CO₂ eq/ton), a large proportion of collected textiles is exported, representing a loss of valuable resources⁵. Infrastructure for advanced sorting and high-value fiber-to-fiber recycling remains underdeveloped, with current rates below 1%⁶. Consumer awareness regarding proper disposal practices is also a significant barrier.

According to the Waste Agency of Catalonia, the selective collection of the textile fraction in Catalonia in 2023 was 21,252.21 tons for a population of 7,901,963 inhabitants⁷. At the domestic level, this represents 4% of the total waste generated in households⁸. Specifically:

- **5-10%** is reintroduced locally through second-hand sales.
- **60-70%** is exported for reuse and recycling to destinations primarily in Asia (Pakistan being one of the main recipients), Africa, and other parts of Europe⁹. It has been reported that Pakistan imported 3,500 tons of used clothing from Catalonia in 2020 alone¹⁰.
- **The remaining 5-10%** is disposed of (incinerated or landfilled), stored indefinitely, or treated as improper waste (contamination).

This heavy reliance on export markets represents a significant drain of resources from Catalonia's potential circular economy. These materials, theoretically, could serve as raw materials for local recycling facilities and manufacturers, closing the regional loop. Instead, they are shipped abroad, often to countries where their end-of-life management is unknown and potentially unsustainable¹¹. This practice effectively shifts the environmental burden associated with waste management to other parts of the world and undermines the goal of creating a self-sufficient regional circular system.

Furthermore, the actual rate of high-value recycling, especially fiber-to-fiber recycling (where old textiles are converted back into new fibers for clothing), is extremely low globally and in Europe, estimated at less than 1%. The infrastructure and technologies necessary to increase the chemical and mechanical recycling of complex post-consumer textile waste are still largely in their infancy¹². The Circular Fashion Pact of Catalonia sets ambitious targets for 2024, aiming to increase preparation for reuse to 55-60% and recycling to 40-50% of collected waste. For this to feed back into the local industry, it requires significant technological advancements and infrastructure development that currently appear to be lacking.

Looking at technical textiles (or advanced materials), the data is more difficult to present. If 15,000 tons of textile waste are generated at the industrial level in Catalonia (2022 data according to the European statistical classification CRE2014¹³), roughly 4,800 tons per year would be advanced materials, assuming that 32% of Catalan textile companies belong to this sub-sector.

⁴ www.humana-spain.org, accessed April 10, 2025, <https://www.humana-spain.org/quienes-somos/comunicacion/noticias/recibimos-en-nuestra-planta-a-la-agencia-de-residuos-de-catalunya-en#:~:text=In%20Catalonia%2C%20165%2C933%20tons%20of,texture%20waste%20from%20household%20consumption>.

⁵ Revealing the management of municipal textile waste and citizen practices: The case of Catalonia - ResearchGate, accessed April 10, 2025, https://www.researchgate.net/publication/374937023_Revealing_the_management_of_municipal_textile_waste_and_citizen_practices_The_case_of_Catalonia

⁶ Scaling textile recycling in Europe—turning waste into value, accessed April 10, 2025, <https://vb.nweurope.eu/media/19019/2207-scaling-textile-recycling-in-europe-turning-waste-into-value.pdf>

⁷ <https://estadistiques.arc.cat/ARC/#>

⁸ https://residus.gencat.cat/ca/ambits_dactuacio/tipus_de_residu/residus_textils/index.html

⁹ Revealing the management of municipal textile waste and citizen practices: The case of Catalonia - ResearchGate, accessed April 10, 2025, https://www.researchgate.net/publication/374937023_Revealing_the_management_of_municipal_textile_waste_and_citizen_practices_The_case_of_Catalonia

¹⁰ 90% of textile waste generated by Catalonia's population ends up in ..., accessed April 10, 2025, <https://www.uab.cat/web/newsroom/news-detail/90-of-textile-waste-generated-by-catalonia-s-population-ends-up-in-landfill-or-incinerators-1345830290613.html?detid=1345905873066>

¹¹ Revealing the management of municipal textile waste and citizen practices: The case of Catalonia - ResearchGate, accessed April 10, 2025, https://www.researchgate.net/publication/374937023_Revealing_the_management_of_municipal_textile_waste_and_citizen_practices_The_case_of_Catalonia

¹² Scaling textile recycling in Europe—turning waste into value, accessed April 10, 2025, <https://vb.nweurope.eu/media/19019/2207-scaling-textile-recycling-in-europe-turning-waste-into-value.pdf>

¹³ <https://estadistiques.arc.cat/ARC/?industrial#>

5.3. Waste generated by advanced textile materials companies

The most common types of waste among the cluster's textile companies are:

- **Fluff / dust.**
- **Dyed and discarded fabrics.** Such as edges, quality control offcuts, fabrics discarded during quality control, and leftover scraps after marker making.
- **Cone ends,** meaning the cone itself along with a portion of the yarn. This is a mixed waste, which makes its recycling more difficult.
- **Chemical products** derived from textile processes. Oils, aerosols, etc.
- **Packaging:** Cardboard in various formats (cones, boxes, strawboard, etc.).

The quantities of each type of waste vary greatly depending on the process carried out by the company and its size. An estimated 0.3 tons per month of fluff and 1.2 tons per month of discarded fabrics (edges, quality offcuts, pieces discarded due to poor quality, etc.) are recorded. The data provided by the cluster's companies, however, is consistent with official statistical data at the Catalan level.

Regarding the management of textile waste from the cluster's companies, three main routes are identified: sale for subsequent reuse or recycling, landfill, or contracting an external waste management company.

6. CURRENT AND FUTURE REGULATORY FRAMEWORK FOR TEXTILE WASTE

The textile industry in the EU, Spain, and Catalonia is facing significant regulatory changes toward sustainability and circularity. The European Commission is driving Ecodesign (ESPR), the revision of the Waste Framework Directive (WFD) with Extended Producer Responsibility (EPR), the Digital Product Passport (DPP), and waste shipment controls. Spain is transposing these through Law 7/2022, while Catalonia stands out with the Circular Fashion Pact. These changes prohibit the destruction of unsold goods, mandate EPR, and require the DPP, impacting business compliance. The regulatory trend focuses on sustainability, circularity, and transparency. Textile companies must adapt their strategies to ensure competitiveness.

6.1. Analysis of recent legislation from the European Commission and future outlook

The ESPR (in force as of 07/18/2024) expands ecodesign to all products, including textiles, with the aim of improving sustainability, circularity, and recyclability¹⁴. Technical requirements for textiles are expected by mid-2025¹⁵, including durability, reusability, repairability, and recycled content. The DPP will be mandatory by 2030¹⁶, providing information on product sustainability¹⁷. The destruction of unsold consumer goods (textiles, clothing, footwear) will be prohibited for large companies in 2026/2027 and for medium-sized companies in 2030/2031¹⁸. The revision of the WFD (provisional agreement 02/18/2025) introduces mandatory and harmonized EPR for textiles¹⁹, making producers responsible for textile waste management²⁰. The JRC is working on EoW criteria for textile waste²¹ to promote the market for secondary raw materials. New regulations on waste shipments²² tighten controls on the export of textile waste²³.

Under the ESPR, detailed technical standards for clothing and footwear are expected in the near future by mid-2025, with criteria on durability, repairability, recycling, and the DPP²⁴. A final proposal for EoW criteria for textiles is anticipated²⁵. Additional measures regarding the circular economy, textile waste, and microplastics could be introduced. The Textile Labelling Regulation will be reviewed (proposal expected in the first quarter of 2025) to include sustainability parameters²⁶.

¹⁴ Ecodesign for Sustainable Products Regulation – European: https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en

¹⁵ Regulation on Shipments of Waste: EU Aims to Strengthen its Efficiency: <https://www.curtis.com/our-firm/news/regulation-on-shipments-of-waste-eu-aims-to-strengthen-its-efficiency>

¹⁶ 9 upcoming European regulations set to influence the fashion industry in 2024 – Bcome: <https://bcome.biz/blog/9-upcoming-european-regulations-set-to-influence-the-fashion-industry-in-2024/>

¹⁷ The EU's new Digital Product Passport (DPP): everything you need to know, data d'accès: març 17, 2025, <https://blog.worldfavor.com/the-eus-new-digital-product-passport-dpp-everything-you-need-to-know>

¹⁸ ESPR crash course - How the Ecodesign for Sustainable ..., data d'accès: març 17, 2025, <https://www.carbonfact.com/blog/policy/espr-textile>

¹⁹ Strategy for textiles - Internal Market, Industry, Entrepreneurship and SMEs, data d'accès: març 17, 2025, https://single-market-economy.ec.europa.eu/sectors/textiles-ecosystem/strategy-textiles_en

²⁰ The EU's proposal for extended producer responsibility for textiles - Norton Rose Fulbright, data d'accès: març 17, 2025, <https://www.nortonrosefulbright.com/en/knowledge/publications/d07fc852/the-eus-proposal-for-extended-producer-responsibility-for-textiles>

²¹ Waste Framework Directive (WFD) - Euratex, data d'accès: març 17, 2025, <https://euratex.eu/waste-framework-directive-wfd/>

²² EU Waste Shipment Regulation - Implications and Way Forward for Pakistan, data d'accès: març 17, 2025, <https://thetextilethinktank.org/eu-waste-shipment-regulation-implications-for-pakistan/>

²³ www.carbonfact.com, data d'accès: març 17, 2025, <https://www.carbonfact.com/blog/policy/eu-regulations-for-textile-brands#:~:text=In%202021%2C%20the%20new%20directive,to%20track%20illegal%20waste%20shipments.>

²⁴ 9 upcoming European regulations set to influence the fashion industry in 2024 - Bcome, data d'accès: març 17, 2025, <https://bcome.biz/blog/9-upcoming-european-regulations-set-to-influence-the-fashion-industry-in-2024/>

²⁵ The EU's proposal for extended producer responsibility for textiles - Norton Rose Fulbright, data d'accès: març 17, 2025, <https://www.nortonrosefulbright.com/en/knowledge/publications/d07fc852/the-eus-proposal-for-extended-producer-responsibility-for-textiles>

²⁶ Revision of the textile labelling regulation | Legislative Train Schedule, data d'accès: març 17, 2025, <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-textile-labeling-regulation>

Legislation	Key dates	Key provisions affecting textiles
Ecodesign for Sustainable Products Regulation (ESPR)	07/18/2024: Entry into force; 1st half of 2025: Work plan; Mid-2025 (expected): Technical standards; 2026/27 & 2030/31: Destruction ban; Before 2030: Mandatory DPP	Framework for ecodesign; DPP for transparency; Destruction ban; Disclosure of discarded products.
Revision of the EU Waste Framework Directive (WFD)	02/18/2025: Provisional agreement; 20 months post-publication: National transposition (expected early 2027)	Mandatory and harmonized EPR for textiles; Eco-modulation of fees.
Digital Product Passport (DPP)	Before end of 2023: Basic data; 2023-2027: Specific requirements; Before 2030: Fully mandatory	Digital life cycle record; Data on composition, production, and environmental impact.
End-of-Waste (EoW) criteria for textiles	Ongoing: JRC consultation; Final proposal timeline not specified	Defines when textile waste ceases to be waste; Facilitates recycling and shipments.
Waste Shipment Regulations	2021: Adoption of new directive; 11/17/2023: Provisional agreement on revision	Stricter controls on exports; Requires prior sorting; Prevention of illegal shipments.

Table 1: EU textile regulations timeline.

6.2. Analysis of recent Spanish legislation and future outlook

Law 7/2022 on waste and contaminated soils (in force 01/01/2022) extends EPR to textile waste and mandates separate collection before 12/31/2024²⁷. It prohibits the destruction of surplus textiles²⁸. The Association for Textile Waste Management, together with major retailers, is working toward a collective EPR system²⁹. The Re-viste pilot program will begin in April 2025 to manage textile waste³⁰.

In Spain, the priority will be the implementation of EPR for textiles by 2027³¹.

²⁷ Decathlon, H&M, IKEA, Inditex, Kiabi, Mango and Tendam create an association for the collective management of textile waste in Spain, data d'accès: març 17, 2025, <https://www.mangofashiongroup.com/en/w/decathlon-h-m-ikea-inditex-kiabi-mango-y-tendam-constituyen-una-asociaci%C3%B3n-para-la-gesti%C3%B3n-colectiva-del-residuo-textil-en-espa%C3%B1a>

²⁸ The European textile industry adapts to the new legislation | Ziclos, data d'accès: març 17, 2025, <https://ziclos.com/en/the-european-textile-industry-adapts-to-the-new-legislation/>

²⁹ Decathlon, H&M, IKEA, Inditex, Kiabi, Mango and Tendam create an association for the collective management of textile waste in Spain, data d'accès: març 17, 2025, <https://www.mangofashiongroup.com/en/w/decathlon-h-m-ikea-inditex-kiabi-mango-y-tendam-constituyen-una-asociaci%C3%B3n-para-la-gesti%C3%B3n-colectiva-del-residuo-textil-en-espa%C3%B1a>

³⁰ Spain's Fashion Giants to Start Collecting Used Clothing Waste in 2025 as Part of Trial Program - EcoWatch, data d'accès: març 17, 2025, <https://www.ecowatch.com/spain-fashion-companies-used-clothing-recycling.html>

³¹ The EU's proposal for extended producer responsibility for textiles - Norton Rose Fulbright, data d'accès: març 17, 2025, <https://www.nortonrosefulbright.com/en/knowledge/publications/d07fc852/the-eus-proposal-for-extended-producer-responsibility-for-textiles>

6.3. Analysis of recent Catalan legislation and initiatives

The Circular Fashion Pact (May 2022) promotes sustainability through collaborative goals and projects. The Waste Agency of Catalonia promotes the use of post-consumer textiles as raw material³². Nevertheless, only 10% of municipal textile waste is currently collected separately. Catalonia will continue with the Circular Fashion Pact and other initiatives to foster a circular textile economy, with an emphasis on collection and recycling.

Initiative/Legislation	Geographic scope	Key objectives related to textile waste	Status
Ecodesign for Sustainable Products Regulation (ESPR)	EU	Ban on the destruction of unsold textiles; promotion of recyclability and durability	In force (July 2024)
Revision of the EU Waste Framework Directive (WFD)	EU	Mandatory EPR systems for textiles; increase in collection, reuse, and recycling	Provisional agreement (February 2025)
Law 7/2022 on waste and contaminated soils	Spain	EPR for textiles; separate collection before the end of 2024; ban on the destruction of surpluses	In force (January 2022)
Circular Fashion Pact	Catalonia	Voluntary agreement to reduce waste, increase collection and recycling, and promote recycled content	Launched (May 2022)

Table 2: Comparison of textile waste initiatives in the EU, Spain, and Catalonia.

6.4. Trends, key regulatory insights, challenges and strategic implications

Key trends include a greater focus on sustainability, a strong emphasis on circularity³³, the growing importance of transparency and traceability³⁴, the implementation of EPR systems³⁵, and the prohibition of wasteful practices³⁶. Challenges include regulatory complexity³⁷, DPP

³² Circular Fashion Agreement in Catalonia. First year of action - Interreg Europe, data d'accés: març 17, 2025,

<https://www.interregeurope.eu/good-practices/circular-fashion-agreement-in-catalonia-first-year-of-action-0>

³³ Revision of the textile labelling regulation | Legislative Train Schedule, data d'accés: març 17, 2025,

<https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-textile-labeling-regulation>

³⁴ EU Regulations for Textile & Fashion: Key Updates You Need to Know - Renoon, data d'accés: març 17, 2025,

<https://www.renoon.com/blog/the-latest-agenda-on-eu-regulations-for-textile-fashion>

³⁵ Strategy for textiles - Internal Market, Industry, Entrepreneurship and SMEs, data d'accés: març 17, 2025, https://single-market-economy.ec.europa.eu/sectors/textiles-ecosystem/strategy-textiles_en

³⁶ 9 upcoming European regulations set to influence the fashion industry in 2024 - BCome, data d'accés: març 17, 2025,

<https://bcome.biz/blog/9-upcoming-european-regulations-set-to-influence-the-fashion-industry-in-2024/>

³⁷ Textile Regulations Hub - Carbonfact, data d'accés: març 17, 2025, <https://www.carbonfact.com/textile-regulations-hub>

implementation³⁸, compliance with EPR systems³⁹, meeting ecodesign requirements⁴⁰, inventory management due to the destruction ban⁴¹, and the definitions of waste versus reusable textiles⁴².

Companies must integrate sustainability⁴³, invest in circular design and innovation⁴⁴, improve transparency and traceability⁴⁵, develop waste management strategies⁴⁶, participate in regulatory developments⁴⁷, and consider Catalan initiatives. They can also explore new circular business models⁴⁸.

³⁸ The new EU sustainability textile strategy - GS1 in Europe, data d'accès: març 17, 2025, <https://gs1.eu/wp-content/uploads/2023/03/The-DPP-ApparelTextile-Industry-Briefing-Document.pdf>

³⁹ The EU's proposal for extended producer responsibility for textiles - Norton Rose Fulbright, data d'accès: març 17, 2025, <https://www.nortonrosefulbright.com/en/knowledge/publications/d07fc852/the-eu-proposal-for-extended-producer-responsibility-for-textiles>

⁴⁰ Ecodesign for Sustainable Products Regulation – European: https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en

⁴¹ EU Regulations for Textile & Fashion: Key Updates You Need to Know - Renoon, data d'accès: març 17, 2025, <https://www.renoon.com/blog/the-latest-agenda-on-eu-regulations-for-textile-fashion>

⁴² EU Waste Framework revision agreed, 2030 textile targets set - Just Style, data d'accès: març 17, 2025, <https://www.just-style.com/news/eu-textile-waste-framework/>

⁴³ Revision of the textile labelling regulation | Legislative Train Schedule, data d'accès: març 17, 2025, <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-textile-labeling-regulation>

⁴⁴ Strategy for textiles - Internal Market, Industry, Entrepreneurship and SMEs, data d'accès: març 17, 2025, https://single-market-economy.ec.europa.eu/sectors/textiles-ecosystem/strategy-textiles_en

⁴⁵ EU Regulations for Textile & Fashion: Key Updates You Need to Know - Renoon, data d'accès: març 17, 2025, <https://www.renoon.com/blog/the-latest-agenda-on-eu-regulations-for-textile-fashion>

⁴⁶ Strategy for textiles - Internal Market, Industry, Entrepreneurship and SMEs, data d'accès: març 17, 2025, https://single-market-economy.ec.europa.eu/sectors/textiles-ecosystem/strategy-textiles_en

⁴⁷ Waste Framework Directive (WFD) - Euratex, data d'accès: març 17, 2025, <https://euratex.eu/waste-framework-directive-wfd/>

⁴⁸ Strategy for textiles - Internal Market, Industry, Entrepreneurship and SMEs, data d'accès: març 17, 2025, https://single-market-economy.ec.europa.eu/sectors/textiles-ecosystem/strategy-textiles_en

7. COMPANIES' NEEDS: PROBLEMS TO BE SOLVED

The CIRCULARTeCH project⁴⁹, previously carried out and co-financed by the Waste Agency of Catalonia within the framework of the Circular Economy Promotion program, allowed for the identification of barriers that companies typically encounter when implementing circular economy projects. The creation of the hub should address these barriers in the cases within the project's reach (in the form of opportunities):

Knowledge

BARRIERS	Not having detailed information on how to apply circular economy concepts, or not knowing if their application will yield positive results in the medium term, prevents progress in this direction, despite knowing its importance for the market. Often, given the sector's situation, SMEs may lack the resource capacity to work along these lines as they must address other more immediate priorities.
OPPORTUNITIES	Offer sessions on specific topics where companies need to expand their knowledge.

Economy

BARRIERS	Investing in new technologies entails a risk due to having to allocate resources with an uncertain return, which becomes evident when investment margins are tight. In this sense, this barrier is closely linked to the previous one. Recycled raw materials are usually more expensive than virgin ones, and the final market, despite demanding this type of final product, often does not want to assume the cost.
OPPORTUNITIES	- Sharing information on financial support programs. - Creating synergies between companies if this can help in understanding or opening the market.

The companies consulted highlight specific problems regarding the economic barrier that they encounter when trying to implement circular economy solutions:

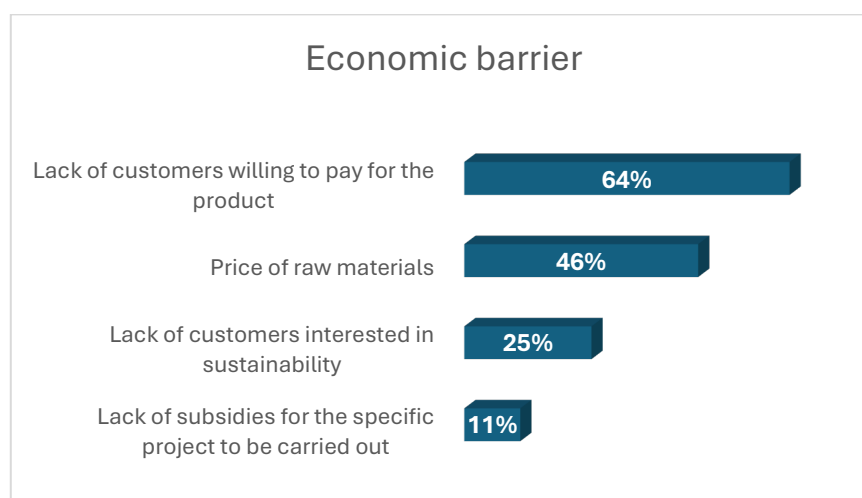


Figure 7. Business response to the various economic barriers.

⁴⁹ <https://www.textils.cat/circulartech/>

Regulation

BARRIERS	Companies need to know the future legislative lines linked to the circular economy that may affect them. The process for legalizing a byproduct can be long.
OPPORTUNITIES	• Inform companies about current legislation and future trends that may affect them.

29% of the companies interviewed mention that the regulations are complex and, therefore, difficult to apply.

Technology

BARRIERS	Working with recycled materials within the advanced technical materials sector is more complex than in the fashion sector, as specific requirements must still be met despite working with a material that complicates the production process.
OPPORTUNITIES	• Stay up to date with new developments regarding research in existing recycling technologies and new available materials. • Commit to new technologies to ensure their development.

25% of the companies interviewed state that the raw materials that could be purchased, which are more environmentally efficient as substitutes for current ones, do not have the same performance characteristics; therefore, making the switch is problematic, as it would result in a more sustainable product but at the expense of its quality.

14% of the companies mention that they would need to adapt existing technology to introduce a new material, which would involve a significant financial expense.

Availability and proximity of materials

BARRIERS	Recently, a decline in European raw material suppliers for the textile sector has been noted, which complicates the traceability of the final product in some cases.
OPPORTUNITIES	• Share knowledge about the companies in the sector located within our territory. • Organize activities to generate synergies between companies.

7% of the companies interviewed indicate that they cannot find nearby suppliers, and 11% cannot find the material they are looking for on the market.

Diversity of the sector

BARRIERS	The sector is small and diverse; therefore, general ideas will not help everyone.
OPPORTUNITIES	• This fact can also be an opportunity to work together, establish links, and collaborate.

The main problem to be solved is, therefore, how to facilitate the transition toward a circular economy model for advanced technical textile companies in Catalonia, overcoming these barriers and taking advantage of existing opportunities.

8.SUPPORT FOR COMPANES: THE CIRCULAR HUB

8.1. Why a circular hub?

The creation of a circular hub is presented as a strategic and necessary solution to efficiently and collaboratively address the complexities of the transition to the circular economy in the advanced textile materials sector in Catalonia.

A hub can facilitate collaboration and connection between the different companies in the sector, as well as with other actors in the value chain. A specialized hub like this allows you to:

- **Responding to sector-specific barriers:** Companies in the advanced textile materials sector have specific challenges in relation to the sustainability of their materials. A focused hub can offer solutions and knowledge adapted to these specificities.
- **Fostering the creation of circular value chains:** The hub acts as a nexus to connect companies that generate waste with those that can use it as secondary raw materials, facilitating the creation of new value streams and reducing dependence on virgin materials.
- **Drive innovation in the recycling of advanced textile materials:** These types of textiles often have complex compositions and require advanced recycling technologies. The hub can promote the development and implementation of these technologies, as well as the creation of new recycled materials with the necessary technical features.
- **Reducing the environmental impact of the sector:** By facilitating circularity, the hub contributes directly to the reduction of waste generation, the conservation of natural resources and the reduction of the carbon footprint of the Catalan technical textile sector.
- **Improve the competitiveness of companies:** The adoption of circular economy practices can generate new business opportunities, reduce costs (for example, in waste management or in the purchase of raw materials), improve brand image and increase access to markets that are increasingly sensitive to sustainability.

8.2. Functions and characteristics of the circular hub

The circular hub is configured as an active and multifunctional agent for the transformation of the sector. The new Tèxtils.CAT hub offers:

- **Digital and physical platform:** The hub has a web platform for virtual connection, dissemination of information and the creation of a market for waste and secondary materials. In addition, physical spaces Tèxtils.CAT provided to carry out activities, meetings, workshops, meetings and other activities directly related to the circular hub.
- **Organisation of technical conferences and visits to companies:** To facilitate the exchange of practical knowledge and visits to facilities where sustainable and circular industrial processes are carried out.
- **Support in the identification of suppliers and customers of recycled materials:** Act as an intermediary to connect the supply and demand of secondary materials within and outside the sector.
- **Promotion of pilot and demonstration projects:** To support the implementation of projects that validate the technical and economic feasibility of new circularity solutions.
- **Creation of thematic working groups:** To foster collaboration between companies with common interests in specific areas of circularity (e.g. the recycling of a specific type of technical fibre).
- **Monitoring and monitoring of waste streams:** Collect data on waste generation and destination in order to improve understanding of the system and identify new opportunities for circularity.

8.3. Implementation and management of the circular hub model at the Catalan level

The circular hub in Catalonia is now fully operational, consolidating itself as a benchmark in the sustainable and collaborative management of the textile sector. The hub was launched at Tibidabo in September 2024 in front of more than 40 participants. Two round tables took place at this event, as well as a workshop and a speed dating session.



Figure 8. Official launch of the circular hub at Tibidabo (Barcelona).

Its implementation has had rigorous strategic planning and the active involvement of various actors, allowing for efficient and results-oriented structuring.

- **Defined and operational governance structure:** The management of the hub is in the hands of a professionalized structure by Tèxtils.CAT, with a team dedicated to the coordination of activities, the management of information and the dynamization of collaboration. This structure guarantees the proper functioning of the hub, facilitating an effective transition towards a circular model within the advanced textile materials sector in Catalonia.
- **Adhesion and consolidated business participation:** The information and recruitment campaign has resulted in a high level of participation from companies, which benefit from services adapted to their needs. The diversification in levels of participation has allowed a broad and flexible inclusion within the hub.
- **Waste and needs mapping methodology implemented:** An effective methodology has been developed and applied for the collection and analysis of information on waste and the needs of companies, ensuring the confidentiality of data and allowing an optimization of resources throughout the value chain.
- **Efficient logistics models for collection and processing:** The waste collection, transport and treatment processes have been defined and optimised to ensure sustainable and efficient management, adapted to the diversity of waste types and the geographical distribution of the participating companies.
- **Active programme to promote collaboration and innovation:** The hub has established a regular calendar of activities, including meetings, workshops, seminars and visits, which have facilitated interaction between companies and the generation of joint projects. In addition, strategic priorities for innovation have been defined according to the needs of the sector.
- **Communication and marketing strategy in operation:** The hub has implemented an effective communication strategy to give visibility to its activities and results. Its website has become a key channel for the dissemination of information and interaction with the different actors in the sector, both nationally and internationally.
- **Operational impact monitoring and evaluation system:** Key performance indicators (KPIs) have been established to measure the hub's impact on the circularity of the sector, such as the volume of waste recovered, the number of collaborative projects and the reduction in

the use of virgin materials. Regular evaluations are carried out to continuously improve the efficiency of the hub.

8.4. Activities carried out within the framework of the hub

The Tèxtils.CAT Circular Hub acts as a driver of transformation in the technical and advanced textiles sector, driving the transition to the circular economy through a set of strategic initiatives that are developed in various areas. The main areas of action are detailed below:

8.4.1 Marketplace

One of the hub's most relevant proposals is its circular marketplace, a platform that acts as a bridge between waste generation and its transformation into new products and business opportunities. It is made up of a set of files (physical and digital) of 47 waste from different companies in the value chain of the advanced textile materials sector. Each waste is identified with the company's acronym, year and number, the materials that compose it, its structure, dimensions and current use. The presence of this waste in the marketplace facilitates the connection between the companies that generate it and those businesses, designers or students who want to reuse it, thus favouring the creation of high value-added products and reducing the environmental impact.



Figure 9. Example of a waste sheet in digital format.



Figure 10. Example of a waste sheet in physical format.

8.4.2 Skills

The hub is committed to the training and constant updating of professionals in the sector. In this area, several initiatives are being launched to enhance the skills necessary for the transformation towards circular models, such as:

- **Specialized training:** Development of MOOCs, courses and exclusive training designed to respond to the challenges of circularity in the textile value chain. Aimed at both students

and professionals in the sector, these learning tools seek to strengthen skills and knowledge in the circular economy, ecodesign, digitalisation and innovation. Examples of this are the ADDTEX, CLEANTEX, FACTIVE and DESTEX projects.

- **Digital teaching materials:** Creation and dissemination of e-books, manuals and other training resources that collect up-to-date practical and theoretical knowledge. For example, the SUSTEX sector guide designed to promote the substitution of hazardous chemicals, or the FLAREX roadmap with the best available products to replace flame retardants with toxic and/or prohibited components.
- **Studies:** Promotion of several studies aimed at understanding the current situation of the sector, identifying previous initiatives and defining the key players to move towards a more sustainable and circular business model. We find them in open format, such as TEX-R-HUB, TEXSOPACK, PROYECTO CIRCULAR.TÈXTILS.CAT or CIRCULARTECH, and exclusive technical studies for cluster members, such as market studies for fibers with low environmental impact.
- **Webinars:** Organization of exclusive webinars and training focused on improving the environmental impact of companies, summaries on fairs or congresses related to sustainability, etc.

8.4.3 Innovation

The hub promotes innovation in the sector through projects and business success stories, as well as by supporting emerging initiatives. Let's break down these key actions:

- **Collaborative projects:** Participation in 13 European and national projects integrated in recycling and circularity processes, training and sustainable materials and products.
- **Business success stories:** Dissemination of 20 outstanding business projects that serve as an example to replicate good practices and encourage the development of new solutions.
- **Calls for funding:** Facilitating access to aid and subsidies, connecting companies with public and private bodies to promote innovative and sustainable solutions. At the European level we find the examples of In Transit, xBUILD-EU, EuroboosTex, Horizon, I3 and LIFE; and at the Catalan level those of the Waste Agency of Catalonia and ACCIÓ.

8.4.4 Networking

Strengthening contact networks is essential to foster collaboration and innovation in the sector. In this area, the hub organizes and develops events, seminars and meetings, both face-to-face and virtual, that bring together companies, clusters, research centers and public agents. These meetings facilitate the creation of synergies and transnational collaboration, generating opportunities for the development of joint projects and knowledge transfer. Here are some examples:

- **International collaboration forum:** the hub hosted a delegation of companies and organizations from all over Europe to present success stories of green transition and *smart textiles* carried out in Catalonia, and to facilitate international *networking* between the cluster and visitors.



Figure 11. International delegation in Montjuïc (Barcelona).

- Launch of the hub in Tibidabo: More than 40 participants from the Catalan ecosystem participated in an event where the hub was presented, two round tables took place, as well as a *workshop* and a *speed dating* session.
- ADMANTEX2i Conference: Meeting of partners that was attended by more than 30 companies from the cluster, European partners of the project and the secretary general of the European Textile Platform. In fact, Tèxtils.CAT is part of two European reference networks in the sector, such as the aforementioned Textile ETP or EU-Textile2050.



Figure 12. Final event of the ADMANTEX2i project at CECOT (Terrassa).

- Techtextil 2024: Participation in the most important fair of advanced textile materials worldwide. 102 countries participated in the edition, around 38,000 visitors and 1,700 exhibitors.



Figure 13. The circular hub in Techtextil 2024.

These networking activities contribute to consolidating a collaborative community that promotes the development and dissemination of circularity in the textile sector.

8.4.5 Updates and maintenance in the future

The Tèxtils.CAT Circular Hub is a dynamic project in constant evolution. In order to guarantee its relevance and effectiveness, it works on a continuous process of updating and improving its tools and resources. In this regard, several strategic actions are planned to ensure the expansion and consolidation of the hub in the future:

- **Expansion of the circular marketplace:** The addition of new materials and waste to the marketplace is planned, with the incorporation of advanced fabrics from new companies.
- **New studies and training resources:** The hub will continue to promote research and the development of new studies aimed at improving circularity in the sector. The publication of analyses on emerging trends in sustainable materials, practical guides on environmental regulations and new specialized training courses are planned.
- **Expansion of the networking network:** New international conferences and events are planned to strengthen collaboration with other clusters, technology centres and companies. Of particular note is the participation in global fairs such as Techtextil 2026 and the creation of specific sectoral meetings to promote synergies between companies.
- **Incorporation of new companies and collaborators:** With the aim of generating more opportunities and synergies, the integration of new companies into the hub will continue to be promoted, including manufacturers of innovative materials, start-ups specialising in circularity and leading research institutions.

In summary, the activities of the Tèxtils.CAT Circular Hub are configured as an integrated ecosystem that promotes training, innovation, sustainability and the creation of collaborative networks. Each area of action reflects the hub's commitment to transforming the sector towards a more circular, efficient and environmentally friendly economy.

9. CONCLUSIONS AND ACKNOWLEDGMENTS

The creation of a co-created hub for advanced textile materials companies in Catalonia is presented as an innovative and forward-looking strategy to promote the circular economy in this strategic sector.

This study has highlighted the importance and feasibility of creating a circular hub as a transformative tool for the sector. The initiative responds to a growing need for companies to improve the management of their pre-consumer waste in an increasingly demanding regulatory context and a growing environmental awareness. The implementation of the hub not only allows companies to optimize their waste management, but will also open up new business avenues and strengthen their competitiveness in a global market that increasingly values sustainability and circularity.

It is crucial to note that this work has a potential catalytic effect that transcends the sector. The hub model that has been defined, based on collaboration, knowledge sharing and the facilitation of waste recovery, is proposed with a vocation for replicability. The methodologies, tools and good practices identified in this study could be adapted and implemented in other industrial sectors that are also facing the challenge of the transition to a circular economy. In this way, the TEX-r-HUB project and its materialization through the circular hub could become a benchmark and a driver for the transformation of the Catalan industrial fabric as a whole.

Through active collaboration between companies, the support of entities such as Tèxtils.cat and the involvement of other actors in the value chain, the hub has the potential to overcome existing barriers, generate new value opportunities from waste and contribute significantly to reducing the environmental impact of the sector, positioning Catalonia as a leading territory in the production of advanced technical textiles under a circular economy paradigm.

Finally, Tèxtils.CAT expresses its gratitude to all the companies and entities that have participated in this study, sharing their experience, knowledge and perspectives. His contribution has been fundamental to the definition of a hub model that truly responds to the needs of the sector. We would also like to thank the support received from institutions such as the Waste Agency of Catalonia that have made this study possible.