

## D.3.2.1 Woolshed Factory definition

Brief and Matrix of technologies and infrastructures from lab to industrial scales

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### WOOLSHED ALPINE SPACE

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<b>Abstract (for public dissemination only)</b>	This document introduce the concept of Woolshed Factory and present the first draft of the Woolshed Factory Catalogue
<b>Keywords</b>	Distributed manufacturing, Make, Value-Chain

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## Introduction

Technologies and tools illustrate how we make and produce things in our society. Moving towards slower and more regenerative systems requires a better awareness of our surroundings, the functions each object supports, and the consequences machines have on humans and ecosystems. With the outsourcing of production, we tend to lose know-how and the infrastructure to fabricate. It is crucial to preserve the knowledge of how we make things and to empower people with the ability to create and fabricate.

Zooming from the individual to the territorial level, we can ask ourselves how to create the capacity for people to conceive and produce what they use and consume with the resources accessible in the territory, without destroying what makes the natural ecosystem unique.

In the Alpine bioregional context, sheep wool is one of the resources that can be used as an input for circular and regenerative value chains. The history of sheep wool in the Alps demonstrates many techniques and know-how for processing woolen products from farmers, artisans, and wool companies. It also highlights the risk of abandoning wool for economic or market trend reasons, turning off existing machines, sidelining makers, and leaving only traces of past activities and stocks of unused wool. Farmers and breeders struggle to sell their wool for respectable prices, while creatives, artisans, makers, and new designers demand local materials and seek to revive the power of local fibers in their designs.

The Woolshed project envisions a new collaborative model to process wool fairly for breeders and farmers and to ensure good quality so wool makers can create high-value products to meet the basic needs of people living in the Alpine territory. To make this easier, partners are envisioning the Woolshed Factory as a place for experimentation and knowledge exchange about past, current, and future infrastructure, technologies, and tools used for wool processing. Far from a linear and centralized model of fabrication classically described in the wool industry, the Woolshed Factory aims to be collaborative and distributed through the territories while fostering the mutualization of tools across the wool ecosystem.

Through the MAKE work package, Woolshed partners will develop a better understanding of current infrastructures and gaps encountered by local stakeholders, enhance local capacity for making, and create an open-source catalogue of tools, equipment, and machines that can be used to collaboratively process wool. This catalogue will be available for any curious people and makers who would like to process wool and be guided on how to use the tools.

As we imagine more sober ways of living, it is also important to question the technologies that are needed and rethink our choices not only through the lens of efficiency but to last with what makes more sense for sustainability in the long term. This is why the Woolshed Factory Catalogue will be connected to a Low-Technologies approach. Each tool and piece of equipment presented in the catalogue will be qualitatively commented through the six criteria of the Low-Tech approach, so that readers can compare how technologies fare in terms of simplicity, efficiency, durability, maintainability, ease of use, and local provenance.

In this document entitled "Woolshed Factory Definition," we invite readers to better understand what the Woolshed Factory is (Part 1) and present the first designs of the future Woolshed Catalogue (Part 2).

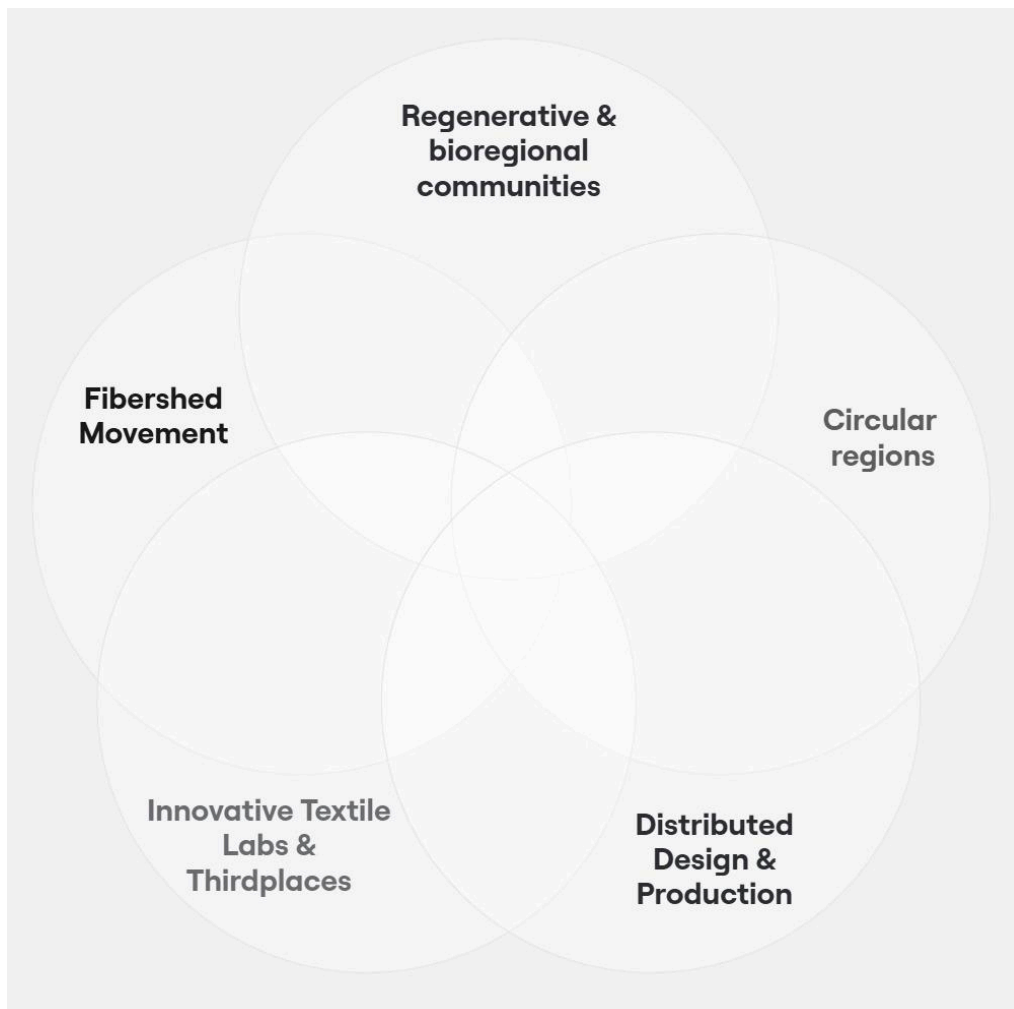
# 1. Part 1: Situating the Woolshed Factories

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## 1.1. What are the sources and inspirations?

### 1.1.1. Woolshed Factory - Discover the inspirational domains

The concept of the Woolshed Factory is emerging at the intersection of several interconnected domains. It is rooted in the desire to revitalise local textile value chains with a better awareness of natural ecosystems, fairer and less harmful practices, while enhancing skill capacities, and prioritising more appropriate technologies. Members of the consortium have been exploring new models and practices, drawing insights from the fields of circular and regenerative communities and distributed manufacturing. They emphasise the role of innovative collaboration spaces such as textile labs, makerspaces, and creative hubs in driving these changes.



*Figure 1: Intersection of Domains*

Here is a short overview and key references to deep dive in each domain:

**Table 1: Woolshed Factory Domains**

Domain	Description
Circular regions	Cities and regions engage in implementing circular economy practices, sharing models, tools and other resources to better close loops and optimise material & energy flows at local levels.
	European Network of Circular Cities and Regions: <a href="https://circular-cities-and-regions.ec.europa.eu/">https://circular-cities-and-regions.ec.europa.eu/</a> Systemic approaches for circular regions <a href="https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1530198419.pdf">https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1530198419.pdf</a>
Regenerative & bioregional communities	According to Daniel Wahl (2001), Regenerative and bioregional communities focus on the appropriate scale for regional self-reliance, responsible environmental action and human participation in the community of life.”
	Systemic Design Labs and the Multi-Scalar Governance model <a href="https://openresearch.ocadu.ca/id/eprint/4220/1/Luthe_Bioregional_Paper_2022.pdf">https://openresearch.ocadu.ca/id/eprint/4220/1/Luthe_Bioregional_Paper_2022.pdf</a> Wahl, D. C. (2016). <i>Designing regenerative cultures</i> . Triarchy Press.
Fibershed Movement	Fibershed is a movement that promotes regional and sustainable textile production, offering resources and guidelines for eco-friendly textile practices.
	Key website of the Fibershed Movement with associated resources: <a href="https://fibershed.org/2023-design-challenge-resources/">https://fibershed.org/2023-design-challenge-resources/</a>
Distributed Design & Production	Distributed Design & Production examines how decentralized manufacturing and design can support sustainability and local economic growth. The work developed by Fab City and the Distributed Design platform is an inspiration for any practitioner wishing to implement distributed production in their territory.
	Key website of the Fab City Network, with associated resources: <a href="https://fab.city/resources-local-productive-ecosystem/">https://fab.city/resources-local-productive-ecosystem/</a> Distributed Design community resources: <a href="https://distributeddesign.eu/wp-content/uploads/2022/06/This-Is-Distributed-Design-Book-2021.pdf">https://distributeddesign.eu/wp-content/uploads/2022/06/This-Is-Distributed-Design-Book-2021.pdf</a>
Innovative Textile Labs & Third places	Network of collaborative spaces in textile design and production, emphasizing sustainable and innovative practices through mutualisation of tools and peer-learning activities.
	<a href="#">Fabricademy</a> as textile labs and learning network: <a href="https://shs.cairn.info/journal-of-innovation-economics-2024-1-page-103?lang=en">https://shs.cairn.info/journal-of-innovation-economics-2024-1-page-103?lang=en</a> Textile & Business Labs in Europe: <a href="https://www.tandfonline.com/doi/abs/10.1080/15487733.2022.2039491%4010.1080/tfocoll.2024.0.issue-sustainable-redesign-of-the-global-fashion-system">https://www.tandfonline.com/doi/abs/10.1080/15487733.2022.2039491%4010.1080/tfocoll.2024.0.issue-sustainable-redesign-of-the-global-fashion-system</a>

### 1.1.2. Inspirational Projects & Platforms

Woolshed Factory draws inspiration from existing projects and does not aspire to reinvent the wheel. The idea for the project originated from a preliminary open research initiative conducted within the Shemakes project, where textile labs sought to gain a deeper understanding of local wool processing. Labs organised visits, local co-creation activities, dyeing workshops and gathered a small database of open source tools to process wool.

Here is a description of a few inspirational initiatives with references included at the bottom of each description:

**Table 2: Inspirational initiatives for the Woolshed Factory Catalogue**

Initiatives	Description
Shemakes Little Wool Factories	Developed within the Shemakes project as collaborative research inside textile labs and their local wool ecosystems, the "Little Wool Factories" is situating the overall wool process mapping and add practices ranging from large scale industries to small scale independent initiatives to better understand the required equipment and ideate on how it can be reproduced with digital fabrication equipment, providing blueprints and tutorials on assembling open source tools and machines for setting up small scale wool factories.
	<a href="https://fabricademy.fabcloud.io/shemakes/handbook/2.-innovation-services/Lab-to-Lab-Research/03_MAKE/">https://fabricademy.fabcloud.io/shemakes/handbook/2.-innovation-services/Lab-to-Lab-Research/03_MAKE/</a>
Wool Tools	Wool Tools is a research project by Atelier LUMA in collaboration with AATB. It explores the integration of needle felting technology with robotic manufacturing to innovate wool processing. The project develops custom hardware and software to enhance the treatment and aesthetics of felted wool, allowing for modular digital manufacturing processes. It was showcased at the Bioregional Design Practices exhibition during Milan Design Week 2023, demonstrating live production combining traditional and digital felting techniques.
	<a href="https://www.wool-tools.com/">https://www.wool-tools.com/</a>
Fibershed Mill Inventory	The Fibershed Mill Inventory is part of a project aimed at mapping and promoting local fibre systems. It provides a directory of mills, helping to connect producers with local manufacturing resources to support sustainable textile production.
	<a href="http://nationalmillinventory.com/">http://nationalmillinventory.com/</a>

Mini-Mills	<p>Belfast Mini Mills offers compact machinery for fiber processing, catering to various scales of operation from hobby farms to large-scale farms. They provide equipment and support for spinning, repackaging, and specialty products, helping clients start and expand their fiber production businesses. Their machinery is used globally, and they offer resources for both beginners and those looking to grow their operations.</p> <p><a href="https://minimills.net/">https://minimills.net/</a></p>
National & International databases such as Lanathèque	<p>The Lanatheque platform lists contractors serving the French wool industry and a selection of materials with certified traceability. It guides the choices of companies or brands towards relocalized processing in France or nearby regions, focusing on a historic natural resource. It provides visibility to French craftsmanship and industrial sector skills. Lanathèque facilitates the creation of local networks and the supply chain in short circuits for the French wool industry.</p> <p><a href="https://lanatheque.fr/filiere-laine/">https://lanatheque.fr/filiere-laine/</a></p>
Internet of Production	<p>Global alliance of people and organizations who believe in a future of production defined by decentralized manufacturing and shared knowledge. We are building a foundation to enable this future, a world where people can quickly create and fabricate products made from a combination of locally sourced materials and global designs, enabling networks of local manufacturers to connect, allowing them to compete against mass produced imports and globalised supply chains.</p> <p><a href="https://www.internetofproduction.org/">https://www.internetofproduction.org/</a></p> <p><a href="https://search.openknowhow.org/">https://search.openknowhow.org/</a></p>
Make.Works platform	<p>Make Works is a platform that connects designers and makers with manufacturers and fabricators. It serves as a directory and resource to help creative professionals find and collaborate with local production facilities and material suppliers. The platform aims to streamline the process of sourcing and manufacturing, making it easier for designers to bring their projects to life by providing access to a network of skilled producers and high-quality materials. Make Works emphasises supporting local industries and sustainable practices.</p> <p><a href="https://make.works">Make.works</a></p>

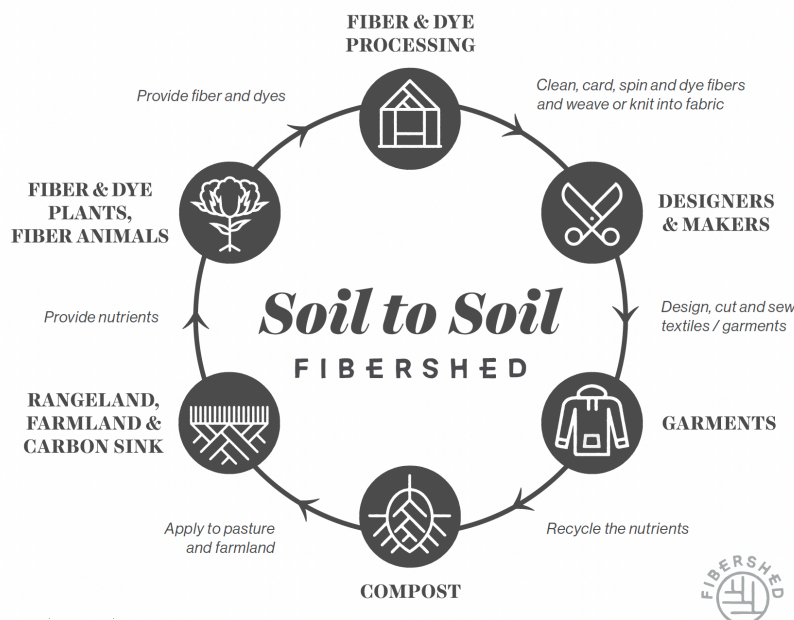
Those projects contain treasures for wool practitioners and must serve as a library for alpine communities appealing to learn about wool and developing wool activities in the alpine bioregion.

## 1.2. What do we envision for the Woolshed Factory?

In simple terms, Woolshed factories are creative and productive hubs for supporting the development of wool processing systems at a bioregional scale. Thus, the Alpine Woolshed Factories are situated in the Alpine region and are able to support local communities across the wool value-chain, by providing knowledge regarding each process needed to transform sheep wool into products. Woolshed Factories are not only places for learning, they intend to be places for fostering collaborative practices of making, such mutualisation of equipment for actors or collaborative small-scale productions.

### 1.2.1. Visual maps of interregional distributed, circular & locally wool value-chains

Even if each Woolshed Factory might target only specific activities, they are based on a systemic approach that integrated all steps of transformation of wool from the shearing until its distribution and use. It also considers more than human strategies as well as end-of-life or regenerative pathways, so as to guarantee respect for natural ecosystems, extended longevity of products and a better valorisation.



Woolshed Value Chains are respecting the Fibershed regenerative systems, moving soil to soil in a circular way.

Figure 2: Soil to Soil Fibershed diagram. Source: Fibershed website

Woolshed Value-Chains are fluctuating according to the territorial contexts, the type of wool fleece, and the local capacity and motivations. Basic processes consist of shearing, scouring, dyeing, carding, spinning, weaving, cutting and sewing. Part of the Alpine wool is also generally good for felting or lining products such as blankets and pillows. At each step, many techniques, machines or tools can be used.

As Woolshed is not focused only on fashion and garment applications, partners have redesigned the Little Wool Factory value-chains to integrate the process of applications such as fertilisers, insulation panels, lining and protective equipment or cosmetics based on lanolin or keratins.

Besides, as a textile fibre, sheep wool is closely related to other fibres present in the territory, its value-chain can cross the way of other fibres from natural plants or other animals or even be blended with second hand textiles or other materials. Then, processes for upcycling textiles, creating precious (recycling) textiles or biomaterials have been added as part of the Woolshed Value-Chains.



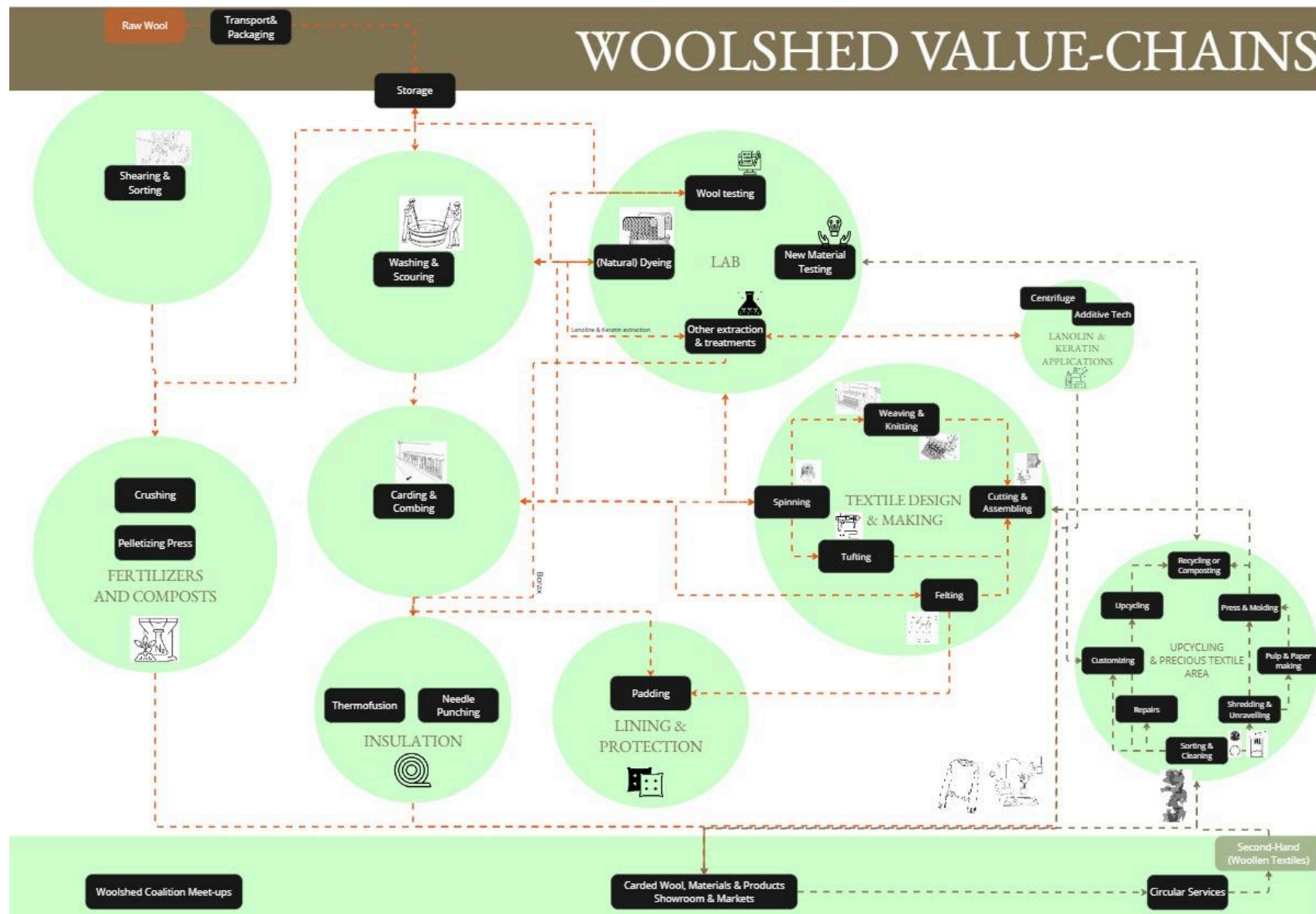


Figure 3: Visual Map of Woolshed Value Chains



### 1.2.2. Definitions from partners

People's ideas and visions of partners were shared during a co-creation session. Here are some examples of partners' viewpoints, regarding what are the Woolshed Factories.

[Zoe]

Woolshed Factory is a collaborative infrastructure inspired by "Latterie Turnarie" (shift-based dairies) designed for the collection, processing, and valorization of rural Alpine wool. It is a local community factory that combines the circular economy, technological innovation, and training, establishing a productive ecosystem connecting farmers, artisans, businesses, and local institutions. Collaborative wool processing, unlike extractive and industrial models, offers a more sustainable and cost-effective alternative. By pooling resources and skills, the most costly processes that are typically outsourced, such as shearing, washing, and transportation, can be shared among members. This approach is not only economically advantageous, but also rooted in cultural practices that value the relationship with the animal and the landscape.

[Zoe] Breeders choosing to join the WF, agree to adhere to a sheep management protocol aimed at maintaining **high wool quality and promoting a bioregional model**. This includes coordinated grazing strategies developed in collaboration with local farmers, access to shared infrastructure and tools that promote animal hygiene, as well as collective coordination for shearing and wool harvesting.

[Lorenzo L.]

A Woolshed Factory is a **community-embedded innovation hub where the Alpine wool heritage meets contemporary, frugal fabrication: a visible, welcoming node in a translocal network of micro-plants**, it offers **open access to modular, low-cost and easy-to-operate technologies**— from digital weaving looms and bio-material extruders to small-scale felting rigs—so that **young innovators, entrepreneurs and craft enthusiasts can co-design, prototype and trial novel wool-based products**. By coupling hands-on experimentation and playful learning with circular business mentoring, each Factory becomes both a reference point for local shepherds, makers and designers and a porous gateway through which knowledge, talent and market opportunities flow across the wider Woolshed network, catalysing resilient, place-centred growth throughout the Alpine region.

*Whenever we speak of, invest in or equip a Woolshed Factory, the foremost values to articulate are **openness, conviviality and purposeful frugality**. The space must remain genuinely porous—equally welcoming to hobbyists exploring their first skein and to micro-entrepreneurs refining limited-edition runs—so **every piece of equipment should be intuitive to learn, safe to share and sufficiently modular to pivot from playful prototyping to small-batch commercial output without costly reconfiguration**. Community cross-pollination is non-negotiable: tools become catalysts for dialogue among shepherds, designers, engineers and bio-material researchers, thereby multiplying skills, ideas and market routes. **Flexibility, reparability and low embodied energy** must guide procurement, ensuring that machinery not only **respects the circular ethos of wool but also keeps maintenance affordable for rural collectives**. Above all, each technological choice should enrich collaboration, spark creativity and reinforce the Alpine territories as vibrant, future-facing places where young talent can thrive without leaving the mountains.*

[Shannon]

An informative and collaborative structure where you can **learn and understand the machine and value chain of wool** of each country.

[Edoardo]

Woolshed Factory is a **collaborative space for research and production that brings together design, craftsmanship, and the local supply chain to promote the mindful and sustainable use and valorization of rustic wool**

[Pauline]

It's a **movement, with spaces, tools, people. Cooperative and innovation by design**, helps go to market for new product made of rustic wool and **made in the Alps (locally)**,

[Mustafa]

An **open knowledge and tool space** to collect and share inspiration and know-how that supports Alpine innovation within the wool ecosystem, fostering initiatives that create value focusing on wool chain.

[Marion -from shemakes)

Woolshed Factory" is situating the overall **wool process mapping** and add practices ranging from large scale industries to small scale independent initiatives to better understand the required equipment and ideate on how it can be reproduced with digital fabrication equipment, providing blueprints and tutorials on assembling **open source tools and machines for setting up small scale wool factories**.

### 1.2.3. Shared definition and core principles

Woolshed Factories are shared places of making, supporting the development of local wool Value-Chains . Each place identified as a Woolshed Factory is supporting learning, prototyping or fabrication of wool products.

As local node, Woolshed Factories can:

- Access and contribute to the common knowledge developed by the Woolshed community, including the Woolshed Factory Catalogue
- Host and use wool processing tools & equipment
- Propose services for local stakeholders, such as wool washing services
- Offer training and community activities
- Explore new projects with local stakeholders
- Foster interregional, national and international collaborations

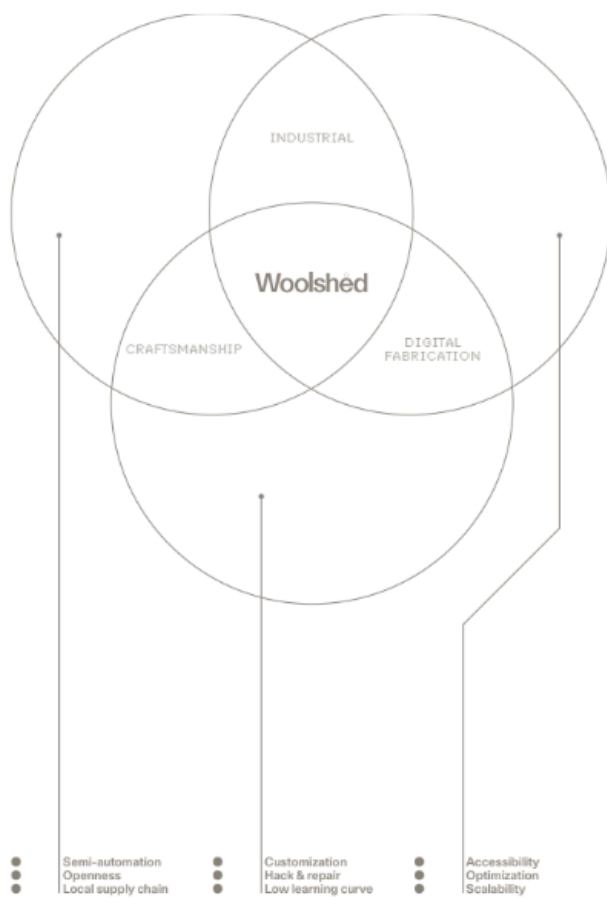
Woolshed Factories are exploring new forms of making with more circularity and collaboration.

Woolshed technologies are highly dependent on the scale of production. The factory infrastructure will have to fit with the context and adapt to the diverse forms of making presents in the community. Solutions can be proposed from home processing, craft/micro-manufacturing workshops to semi or industrial manufacturing.

What does matter with the selection of technologies is to consider not just the economies of scale but to value the strength of community collaboration needed for consolidating trust, coordination, and long-term relationships, enabling joint problem-solving and mutual support in resource-constrained contexts.

Based on the Little Wool Factory diagram, core principles have been debated with partners to best situate the type of tools and technologies that can be developed and used in the Woolshed community. Core principles and a typology were drafted by the partners. (See Figure 6 and Table 3)

The design and selection of technologies is guided by the six following principles:



Technologies are:

**Affordable and locally accessible** to Woolshed communities, both farmers, transformers and citizens.

Intersecting **craft, digital production and industrial scale** manufacturing processes

**Open, customisable, repairable and hackable**

Optimized in terms of **efficiency and durability**

**Simple and easy to use** respecting a low learning curve

Situated in **Technological Readiness Scale** and **Low-Tech** criteria

Figure 6: Woolshed Factory positioning diagram

**Table 3: Woolshed Factory typology**

Scale of production	Licencing (openness)	Machine Current Status	Tool Users	Low-tech criteria	Technology readiness levels (TRLs)
Home	CC BY	Broken - Highly damaged	DIY makers, Learners	Simplicity: Simple design, just the right amount of technology, no more.	TRL1 - Basic principles observed
Micro manufacturing	ShareAlike (CC BY-SA)	Partially Reusable for hacking	Craftspeople	Efficiency: Consumes few resources while delivering what is required.	TRL2 - Technology concept formulated
Semi-Industrial	NoDerivs (CC BY-ND)	To be repaired	Industrial workers	Durability: Can be used for a long time (solid, based on technologies that will still exist several years from now).	TRL3 - Experimental proof of concept
Industrial	NonCommercial (CC BY-NC)	Outdated	Others	Maintainability: Easy to maintain yourself, with standard tools and parts.	TRL4 - Technology validated in lab
	NonCommercial -ShareAlike (CC BY-NC-SA)	Usable		Ease of Use	TRL 5- Component and/or breadboard validation in relevant environment
	Commercial - Copy Right			Local: Uses local resources.	TRL6 - Technology demonstrated in relevant environment
					TRL7 - System prototype demonstration in operational environment
					TRL8 - System complete and qualified
					TRL9 - Actual system proven in operational environment



### 1.3. How do we plan our journey toward Alpine Woolshed Factories?

To initiate the path towards such vision of the Woolshed Factory in the Alps, the partners will organise three parallel working structures that respectively aims to (1) create local nodes where stakeholders can gain skills and experiment together, (2) foster interregional collaborations, and (3) create a solid catalogue to facilitate pollinations of future Woolshed Factory in and beyond the alpine bioregion.

The work relies on the involvement of local ecosystems and peer exchanges of knowledge, mainly technical, regarding wool processing.

#### 1.3.1. Capacity Building & Experimentation in Local Nodes

Following the work initiated with the Woolshed Cartography, each partner in charge of the local ecosystem will act as a local node, a Woolshed factory. During the project, each node will get to better know their community, the inner infrastructure of making and identify what are the local actor motivations, define a set of gaps and collaboration opportunities. Based on this analysis and considering their own resources, they will design and realise a series of interventions that aims to overcome the gaps, completing or consolidating the current capacity of processing. Key learnings will be measured and shared to the other nodes.



Figure 7 : Distribution of activities in local nodes

#### 1.3.2. Fostering Interactions through Transregional Working Groups

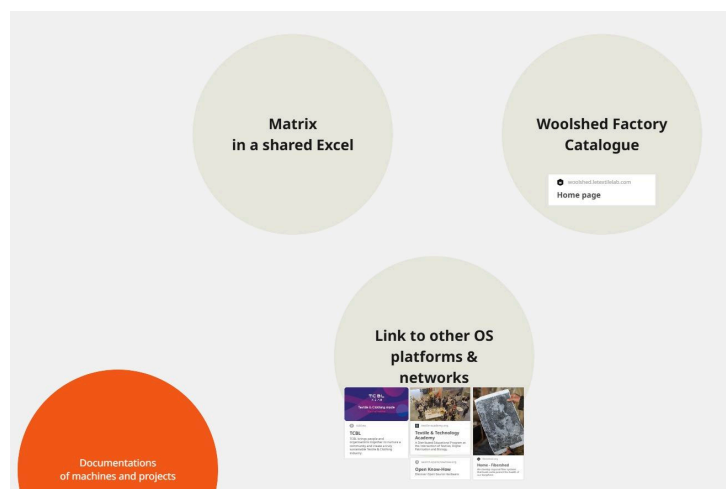
Transregional working groups will facilitate the organisation of collaborative activities between local nodes and directly support the enhancement of bioregional capacity of wool processing. After analyzing the gaps and collaboration opportunities with their local stakeholders, partners will agree on the development of four working groups that will focus on some parts of the value chain.

The diagram illustrates four research areas in wool processing, each represented by a large light green circle. Below these circles are four activity boxes: Visits (brown), Experimentation (dark grey), Exploration (dark grey), and Documentation (orange).

- Enhancing Washing and Scouring Systems**
  - Fermentation process
  - Lack of dyeing machines
  - Low-tech washing station
- Equipping infrastructure for Felt products & Insulated Panels**
  - Carding & felt machines
  - High press
  - Dry wool picker
- (Digital) Textile Craft Practices**
  - Tufted Carpets & Embroideries
  - Robot Machine
  - Knitterate machines
  - Dry loom
  - Dry weaving frames
- Raw Wool & Circular bio-products**
  - 3D printed molds for planting pots
  - Wool shredder
  - New wool-based composites

Activities:

- Visits
- Experimentation
- Exploration
- Documentation





## 2. Part 2: The future of Woolshed Factory Catalogue

The Woolshed Factory Catalogue is a living platform collecting the technologies, tools and methods for each process of the Woolshed Value Chains. Efforts are situated in the data collection of tools, the technological development of platforms and the governance strategies to curate, validate and share the content.

### 2.1. Initial discussions

Partners from Make workpackage met several times to discuss their visions and ideas for the Woolshed Factory Catalogue. While sharing about inspiring existing initiatives (see section 1.1.2), key aspects were highlighted:

- The architecture of both the Little Wool Factory and the Lanatheque platforms are relevant for Woolshed, starting from a process view to deep dive in the detailed description of each technology.
- The Catalogue needs to be more accessible for the diversity of stakeholders, clear and visually attractive
- The Catalogue needs to document the specific projects or interventions that the Woolshed communities are running during the project
- The Catalogue should link with the open source platforms and make it easy to document for the maker communities

Partners decided to start with the creation of an initial matrix integrating all techniques able to process wool and to design an architecture of the future catalogue. Once the matrix is more completed, partners will refine the selection of technologies highlighting their strengths and weaknesses regarding the Woolshed Factory principles, while highlighting the development curated during the Woolshed project.

### 2.2. Set-up of a Matrix

A matrix of technologies has been developed as an Excel database file, listing all machines and technologies respecting the Woolshed Factory Typology and integrating the content needed for the Catalogue.

The spreadsheet is composed by two pages:

- The sheet *Catalogue of equipments* is filled in by generic machines, tools and machines, containing the information present in table xx.

**Table 4: List of elements to fill in for the Woolshed Catalogue**

Key information for the Catalogue	Relation to Woolshed principles	Contributions
ID Name of the tool/machine Fabricant/maker Website documentation Brief Description How-to (Tutorial of use) Activities (what does it do) Sector Focus (For which industry it is used?) Product Value-Chain	Scale of production Licencing / Openness Tool Users TRL Lowtech criterion assessment 1-5 (Simplicity - Efficiency - Durability - Maintainability - Ease of use - Local) Detail analysis: Quantity of Wool per use Time per use, Water per use, Energy per use, Possibility of recycling waste, Negotiable quantity per year Scalability, Process quality, Delivery time price	Comments & Feedback Contributors Stories of uses

- The Sheet “*Alpine machineries*” is emphasizing the equipment present in the Alps. It contains existing machines, linked to the Woolshed Cartography developed in WP1, and will integrate the new development made by Woolshed partners.

All partners are invited to fill in the document and give feedback regarding the machines and tools proposed.

### 2.3. First designs

The Textile Lab Lyon has proposed to host the catalogue in a dedicated website and initiated the development of the main host page, a menu based on the value-chains, a page describing each process, and page detailing a specific technology or method. A connection with the Cartography will be proposed as well as a page dedicated to stories of uses will also be added to capture qualitative feedback from the local stakeholders.

First feedback from partners were collected and will contribute to the new iteration of the platform accessible with this link: <https://woolshed.letextilelab.com/>

Mandatory data for Woolshed Catalogue													Subjective look from Low-tech criteria						
ID	Name of the tool/machine	Fabricant/maker	Website documentation	Brief Description	How-to (Tutorial of use)	Activities (what does it do)	Sector Focus (For which industry it is used?)	Product Value-Chain	Scale of production	Licencing	Tool Users	WHERE ? list of link map W1	TRL	Simplicity: Simple design, just the right amount of technology, no more.	Efficiency: Consumes few resources while delivering what is required.	Durability: Can be used for a long time (solid, based on technologies that will still exist several years from now).	Maintainability: Easy to maintain yourself, with standard tools and parts.	Ease of use: Easy for everyone to use.	Local: Uses local resources.
14	Carding - HARTMANN	HARTMANN	<a href="https://bergaut.it/it/te">https://bergaut.it/it/te</a>	The tool carding machine operates with precision and high speed, separating and aligning wool fibers in one direction to create a uniform fleece.		carding	Manufact...		Micro...		Craft...			4	5	5	2	1	5
15	Needling - DILO	DILO	<a href="https://bergaut.it/it/te">https://bergaut.it/it/te</a>	Needle felting is done using a machine equipped with numerous special needles, each with small barbs resembling hooks. These needles penetrate and pull the wool fleece, causing the individual fibers to interlock, resulting in a progressively denser and felted fabric over time.		Needling	Manufact...		Micro...		Craft...			4	5	5	3	2	5
16	Fulling - De Grood	DE GROOD	<a href="https://bergaut.it/it/te">https://bergaut.it/it/te</a>	Wet felting, also known as fulling, involves treating the wool fleece with hot water and soap. The hot water causes the scales of the wool fibers to open, similar to a pine cone. Through simultaneous pressure and circular movements of the fulling machine, the surfaces of the fibers interlock, forming a solid and durable fabric, the true felt.		Fulling	Manufact...		Micro...		Craft...			4	5	5	4	2	5
17	Knitting - DUBIED	DUBIED		Several machines for the production of knitted fabrics with gauge 5, 8, 12, 14		knitting	Knitwear ...		Micro...	No Lic...	Craft...			1	4	1	1	1	1
18	Winding - SIMET	SIMET	<a href="https://www.simet.it">https://www.simet.it</a>	Unwinds yarn, creates anti-tangle cones		Winding	Knitwear ...		Micro...	No Lic...	Craft...			5	4	4	1	5	1
19	Linking - EXACTA	EXACTA	<a href="http://exactalinkingma">http://exactalinkingma</a>	Linking of knitwear with gauge 5		Linking	Knitwear ...		Micro...	No Lic...	Craft...			2	4	4	1	2	1
20	Linking - COMPLETT 66	COMPLETT	<a href="https://www.complett.it">https://www.complett.it</a>	Linking machine for knitwear – gauge 12		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
21	Linking - COMPLETT 99	COMPLETT	<a href="https://www.complett.it">https://www.complett.it</a>	Linking machine for knitwear – gauge 12		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
22	Linking - COMPLETT 66	COMPLETT	<a href="https://www.complett.it">https://www.complett.it</a>	Linking machine for knitwear – gauge 8		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
23	Linking - COMPLETT 66	COMPLETT	<a href="https://www.complett.it">https://www.complett.it</a>	Linking machine for knitwear – gauge 16		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
24	Flat sewing machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Industrial sewing machine		Linking	Knitwea...		Semi...	No Lic...	Craft...			3	4	4	2	3	2
25	Flatbed chain stitch machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Industrial chain stitch machine		Linking	Knitwea...		Semi...	No Lic...	Craft...			3	4	4	2	3	2
26	1-needle overlock machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Machine that trims and sews the edges of knitwear simultaneously		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
27	Priletta overlock machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Machine that trims and sews the edges of knitwear simultaneously		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
28	2-needle overlock machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Machine that trims and sews the edges of knitwear simultaneously		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2
29	3-needle overlock machine - RIMOLDI	RIMOLDI	<a href="https://www.rimoldi.it">https://www.rimoldi.it</a>	Machine that trims and sews the edges of knitwear simultaneously		Linking	Knitwea...		Micro...	No Lic...	Craft...			3	4	4	2	3	2

Figure 10: Capture of the matrix

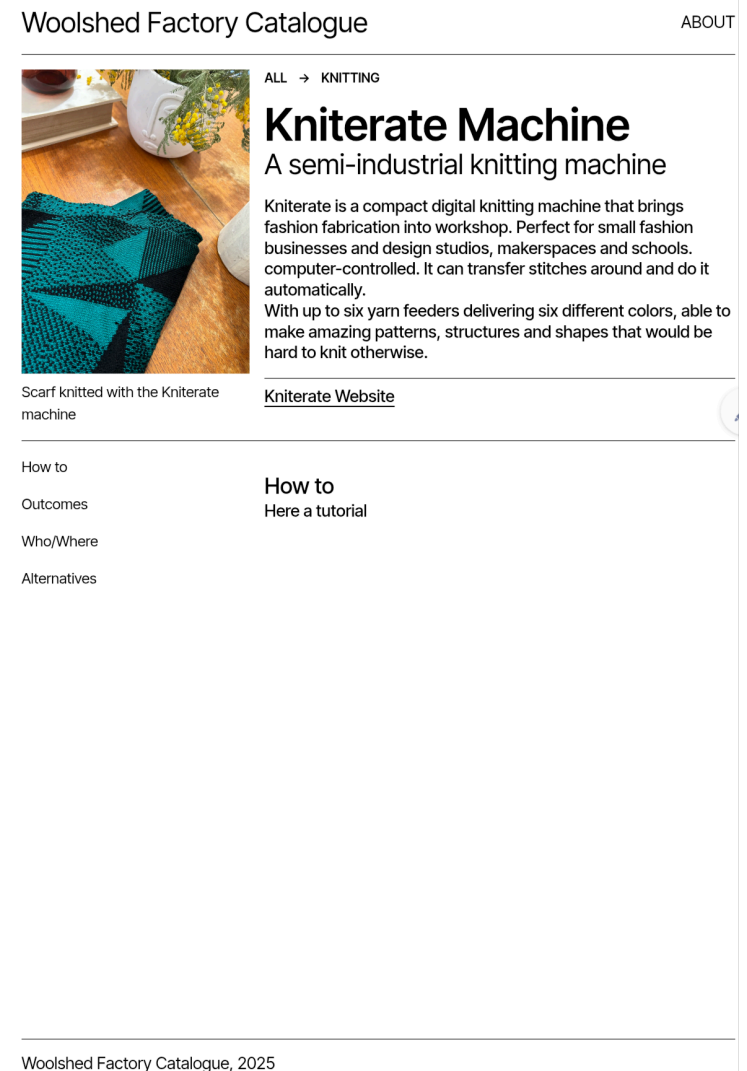
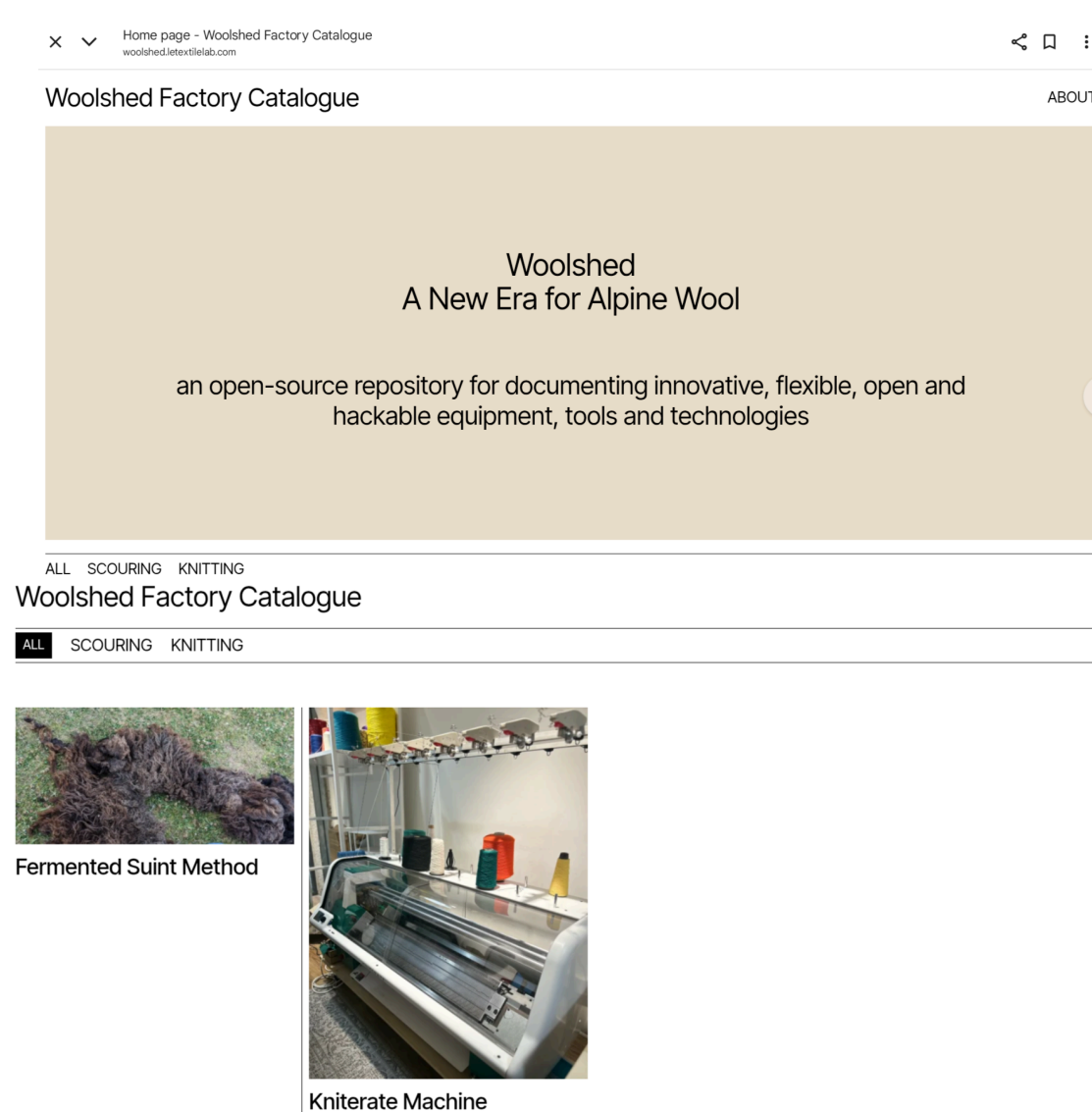


Figure 11: initial designs of the Woolshed Factory Catalogue

## Conclusion

The Woolshed project represents a collaborative step toward revitalizing Alpine wool ecosystems through distributed, regenerative, and community-centered practices.

Woolshed Factories can be seen as a network of spaces and tools that support the Woolshed community in accessing the appropriate knowledge and resources to locally process wool while fostering creative practices to better reimagine the future of rustic wool value chains.

This deliverable has laid the groundwork for the Woolshed Factory concept, outlining its vision, core principles, and the first designs for a living catalogue of tools and technologies. As the project moves forward, the focus will be on fostering local capacity, strengthening interregional collaborations, and curating the Woolshed Factory Catalogue as an open, evolving resource that empowers makers, farmers, and innovators across the Alpine bioregion, and beyond.

## Sources

Woolshed Collaborative Miroboard: <https://miro.com/app/board/uXjVlgoradM=/>

Woolshed Factory Catalogue: <https://woolshed.letextilelab.com/>