

VISION 2030

SUSTAINABLE TEXTILE SYSTEMS



SYSTEMIC CHANGE AS A GOAL

The goal of FINIX's sustainable textile system vision is to briefly and succinctly describe the goal we must reach in terms of the sustainable life cycle of textiles by 2030 – from the production, design, sale and use of textile materials and textiles to collection and sorting. Visio also takes a position on Finland's role on the EU textile map. The vision is intended as a guideline for business practitioners, decision-makers, educational institutions and consumers.

This presentation contains an overview of the vision as well as the goals, measures and necessary actors of the individual phases, which you can find on their own pages.

Vision website (in Finnish):

www.finix.aalto.fi/visio-2030-kestava-tekstiilisystemi

BACKGROUND OF THE VISION AND THE WORKING GROUP

The vision was made during 3/2021–3/2022. FINIX, Suomen Tekstiili & Muoti (STJM), Telaketju network representatives, Turku University of Applied Sciences, VTT and Circular Textiles Innovation Community have participated in the process.

The vision has been based on the results of the FINIX project workshop organized in March 2021, STJM's carbon-neutral textile industry [roadmap](#), VTT's and STJM's joint textile industry [roadmap](#), VTT's and Telaketju's [final report](#), and the European Commission's Circular Economy [Action Plan](#). In addition, other experts from the steering group of the FINIX project have been consulted.

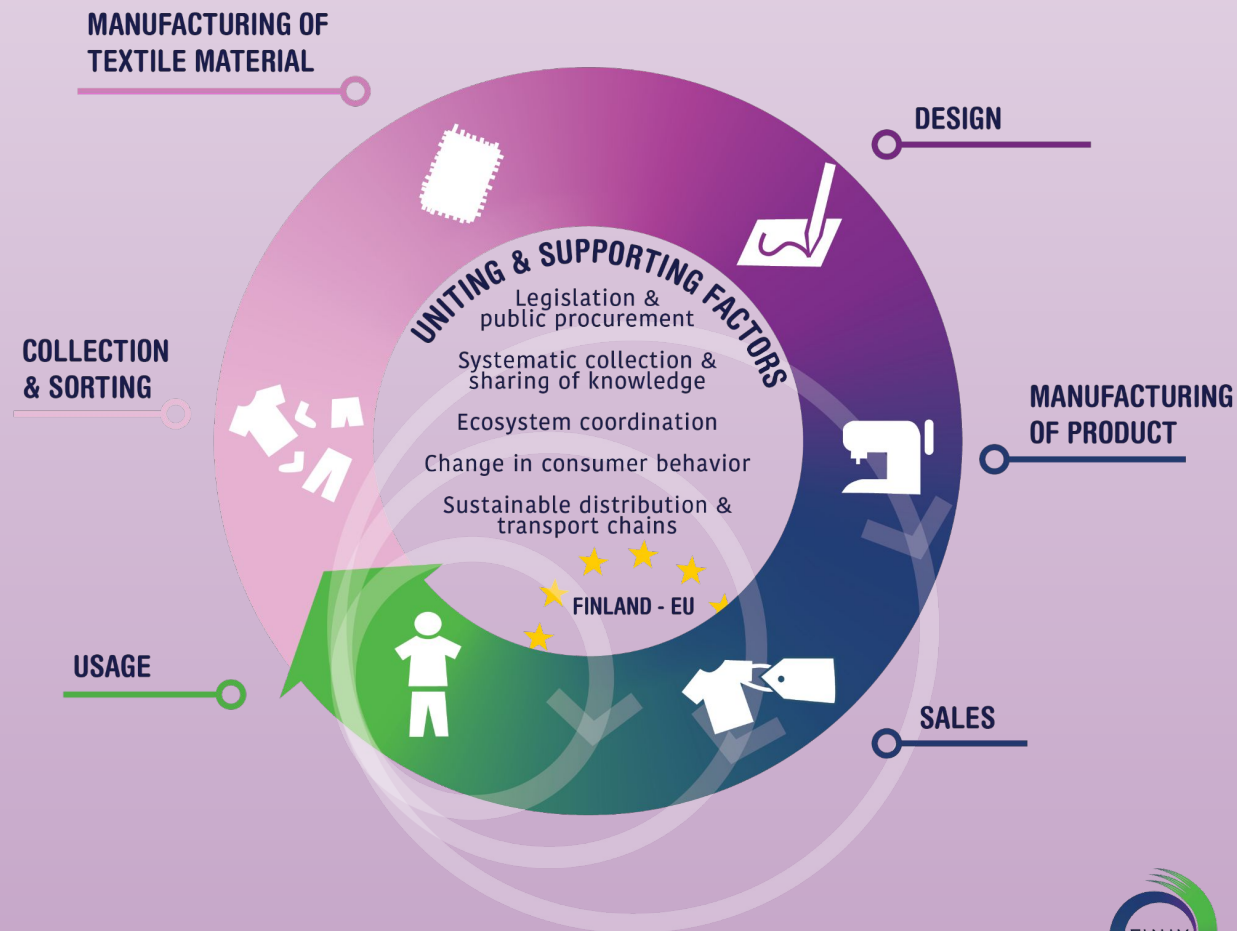


SUSTAINABLE TEXTILE SYSTEM 2030

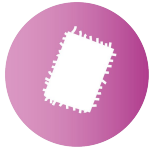
A sustainable, circular economy-based textile system consists of the different stages of the textile value chain: textile material production, design, product manufacturing, sale, use, and collection and sorting. Together, these form an ecosystem where each stage and actor influence each other.

The aim of the ecosystem is to produce closed cycles of materials and energy. This minimizes the environmental impact of both, individual products and the entire system. The ecosystem does not only rely on recycling. Long-term product design, repairs, re-use and sale, distribution and servicing extend the life of the products and reduce the waste of materials and energy in all phases of the materials' life cycle. In addition to changes in the production system, slowing down the purchase of products and reducing overall consumption by influencing consumers' values and purchasing behavior play a key role.

The functioning of the whole is affected by many factors (in the middle of the picture), related to legislation, information sharing and consumer behavior, for example.



SUMMARY OF VISION THEMES



Manufacturing of textile material

New bio-based and recycled materials are used extensively and effectively in the production of textiles. The manufacturing methods of fibers and fabrics impact the environment as little as possible, the materials and products are of high quality, long-lasting and recyclable. Virgin raw materials are used reasonably and responsibly. Along with natural fibers and synthetic man-made fibers, modified fibers made from the cellulose of wood or recycled textiles are used.



Design

The design aims at longevity, repairability of the product and recyclability of the materials. Designers are trained in product design according to the circular economy. The designer is already involved in the selection of raw materials and in the fiber making phase, and cooperation with a technical expert contributes to optimizing the production of fiber, textiles and clothing.



Product manufacturing

Manufacturing a textile product sustainably and with high quality is a profitable business. In manufacturing, social sustainability is ensured, e.g. regarding working conditions and salary. The environmental impact of manufacturing has been minimized and the harmful environmental impact is reflected in the price of the product.



Sales

New business models, for example based on renting and sharing, have a significant market share. The buyer gets reliable information about the products, raw materials, their origin and environmental impact, as well as the different stages of manufacturing and social sustainability.



Usage

Consumers prefer the longevity of the products and buying new ones is decreasing. There are many opportunities to fix, repair or share a product. Products have value in the secondary market, for example in resale and buyback services. At the end of the life cycle, it is easy for the consumer to recycle the product.



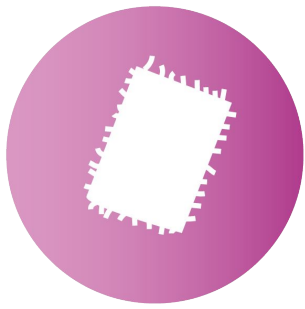
Collection and sorting

New legislation and textile imaging, identification and traceability technologies enable large-scale and high-quality textile collection and sorting. Sorting takes into account the needs of the following steps. The goal is to utilize it in accordance with the highest possible added value.



Finland-EU vision

Finland is a visible and active player on the EU textile map and acts as one of Europe's circular economy centers for textiles.



MANUFACTURING TEXTILE MATERIAL

Where will we be in 2030?

New bio-based and recycled materials are used extensively and effectively in the production of textiles. The manufacturing methods of fibers and fabrics impact the environment as little as possible, the materials and products are of high quality, long-lasting and recyclable. Virgin raw materials are used reasonably and responsibly. Along with natural fibers and synthetic man-made fibers, modified fibers made from the cellulose of wood or recycled textiles, are used.

Image: Mikko Raskinen, Aalto university

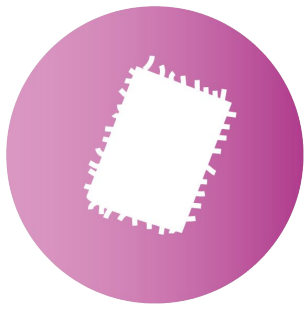


Key themes

- Introducing new bio-based fibers and replacing virgin raw materials
- Sustainable use of wood in textile fibers
- Increasing the use of recycled materials and systems of closed cycles
- Fiber life cycle and appropriate use
- The role of Finnish operators in value chains

Key actors

- **Industrial companies** must actively use recycled materials. If the pressure from consumers is not enough, mandatory legislation is needed.
- **National and EU-level policy makers** and **decision-makers** introduce incentives to increase the use of recycled materials in textile products.
- **Financiers** should be interested in activities that leave Finland with innovative work and value.



MANUFACTURING TEXTILE MATERIAL

What actions are needed to reach the vision?

- New bio-based and recycled textile fibers are widely adopted, replacing virgin fibers and various synthetic fiber materials. In the manufacture of textiles, the safe-by-design principle will be introduced and the use of chemicals will be significantly reduced and we will switch to using bio-based and otherwise safer chemicals for the environment and the user. With the help of finishes, the life cycle of textiles is also extended. The development of bio-based fibers is carried out both in research institutes (Aalto Ioncell, VTT Biocelso) and in companies (Spinnova, Metsä Springin Kuura). Mechanically recycled fiber from recycled fibers is produced by Rester and Lounais-Suomen Jätehuolto and chemically recycled Infinited Fiber Company (Infinna). Thermoplastic recycling of synthetic fibers still requires research. The reduction of the use of chemicals and the development and use of safer chemicals are supported by the introduction of the safe-by-design principle, research and development work, legislation and other incentives.
- The effect of the high quality of domestically produced fibers on the life cycle of the products and their environmental impact throughout the entire life cycle is known. Environmental impacts are determined and easy-to-use tools are also developed to determine them. Through research and development, better alternatives to the chemicals used in the manufacture of textiles are found, and treatments that maintain the quality of textiles are developed.
- In Finland, there is once again textile production, from spinning to the production of knitwear and fabrics, as well as the assembly of textile products. There are spinning mills in Finland with different types of fibers, for wool, e.g. Saimas Spinnery, Spinnova's spinning mill, and also the spinning of cotton-type fibers (here only investment plans, but no decisions). Investments require both public and private funding.
- Digitization and the adoption of new technologies in companies in the textile industry must be supported with the help of public research funding.
- Digitalization and the utilization of new technologies enable agile, demand-responsive production and minimization of production waste.



DESIGN

Where will we be in 2030?

The design of the products aims at longevity, repairability of the product and recyclability of the materials. Designers are trained in product design according to the circular economy.

The designer is already involved in the selection of raw materials and in the fiber making phase, and cooperation with a technical expert contributes to optimizing the production of fiber, textiles and clothing.

Image: Aalto yliopisto



Key themes

- Training of designers
- New design guidelines in the context of sustainability and the circular economy
- Sustainable product design combined with new business models
- Connecting product design to the manufacturing process at a sufficiently early stage, i.e. already at the material selection stage, and on the other hand extending the designer's work to the final stage of the product's life cycle, e.g. up to the recycling of materials.

Key actors

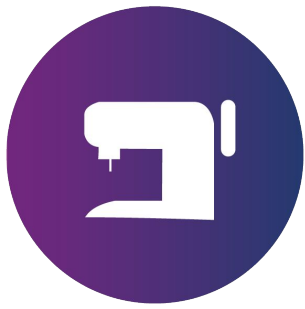
- **Educational institutions** train designers to design according to the circular economy.
- **Universities** and **companies** are developing data management to meet the needs of circular economy planning.
- **The Finnish Parliament** and **the European Parliament** guide product design in accordance with the circular economy by means of various control measures, such as the sustainable products initiative and the eco-design directive, as well as voluntary agreements, public procurement criteria and financial control measures.



DESIGN

What actions are needed to reach the vision?

- The starting point for clothing design is durable materials and the clothing designers' excellent knowledge of materials. The products are basically designed to be more durable and repairable. We choose high-quality materials and pay attention to the aesthetic, structural and technical durability of the product. The teaching of design emphasizes the multi-purpose, adaptability and seasonality of clothes in relation to the brand's strategy. The design is made timeless and multi-purpose, which contributes to the product's long service life. The quality guarantee ensures the durability of the garment. The training should focus on ensuring that the designers have a broad understanding of the effectiveness of the product they are designing, but also of the possibilities in different business models.
- Material choices and structural solutions affect the recyclability and usability of textiles after use.
- Designers can check the sustainability of materials and chemicals using different tools and different data sources to assess environmental impacts (e.g. life cycle assessment LCA, product carbon footprint and water footprint).
- Designers need new tools, e.g. digital tools to support design work.
- Digitalization facilitates both the collection of product information and the transparency of information, as well as the resource efficiency of manufacturing processes.
- Designers can be involved in developing product service systems to extend the life of the product (e.g. repair and loan systems).
- The design of the product is based on the company's sustainability strategy, and therefore the constant updating of the company strategy in the light of new research information is essential.
- Product design supports the sustainability goals set by the company. Product design requires close cooperation between designers, research staff and production planning.
- Data experts and artificial intelligence produce open and transparent data from the entire life cycle of textiles for use by designers. In addition to transparent quantitative and predictive data, qualitative information is needed, which is produced and validated by cross-functional planning teams.
- Integrating digital technology into product design, production and service operations enables production flexibility, agility and resource efficiency. Companies should invest in digital technology.
- Standardization (ISO, CEN, SFS) is an essential tool for defining quality and sustainability.
- Regulation could guide actors to produce and openly offer information related to sustainability, so that the choices made in the planning phase are based on comparable and reliable data.



PRODUCT MANUFACTURING

Where will we be in 2030?

Manufacturing a textile product sustainably and with high quality is a profitable business. In manufacturing, social sustainability is ensured, e.g. regarding working conditions and salary. The environmental impact of manufacturing has been minimized and the harmful environmental impact is reflected in the price of the product.

Image: Unto Rautio, Aalto yliopisto



Key themes

- How to motivate sustainability and higher quality in all manufacturing stages?
- Are human rights realized in all stages of the production chain?
- Where do the adverse effects of production occur and how can they be prevented?
- Where will manufacturing take place in the future?

Key actors

- **Legislators in Finland and the EU** must oblige companies to produce more responsibly, set financial controls and create standards.
- **Research organizations** and **non-governmental organizations** can develop standards and encourage other parties to make changes.
- **Companies** and **universities** develop digital solutions for more ecological manufacturing and receive funding for their work from **Business Finland** and **research funders**.
- **Companies** directly influence their own production chain to ensure its responsibility.
- It is the duty of **consumers** and the **media** to make demands and ask companies about responsible manufacturing.



PRODUCT MANUFACTURING

What actions are needed to reach the vision?

- The clothes are of high quality and long-lasting, and their value is higher than now. A higher value enables the transfer of value to the employees of the production chain as well as better consideration of the environment and a reduction in the number of manufactured products.
- Product manufacturing processes must be transparent. Transparency can be improved by requiring companies to tell with enough precision where and how the products are made, so that the information is easily available to the consumer.
- An ambitious corporate responsibility law will be enacted in Finland and the EU, which obliges companies to respect human rights in their production chains.
- There are precise, consistent guidelines for companies on what constitutes responsible production. The guidelines take into account how working affects the lives of employees holistically: e.g. is the salary sufficient for a reasonable standard of living, does work have health effects, to what extent are employees allowed to influence the quality of work and ways of doing work. These guidelines should be standards at least at the EU level, and the Shades of Green instrument could be used here, for example.
- With the help of science-based methods, companies find out the carbon footprint of their production and other effects on the environment accurately and minimize these effects. It is essential that the sustainability effects of the products are examined over their entire life cycle, also taking into account the sustainability effects arising outside of Finland, as well as indirect emissions, e.g. of logistics. Finland's carbon neutrality goal guides the activities of companies within Finland's borders.
- In the longer term, efforts should be made to promote the local production of products. However, the integration of the manufacturing phase must be done as planned and in such a way that the negative effects it causes in the current production countries are compensated and the countries are supported in the transition. The use of recycled fibers enables local manufacturing.
- There is a need for the development of financial control measures that can price environmental impacts into product prices.
- Digitalization, artificial intelligence and the utilization of new technologies enable agile, demand-responsive production, minimization of production waste, and traceability. Possibilities include the automation of small production in terms of printing and sewing, as well as the personalization of products using 3D modeling.



SALES

Where will we be in 2030?

New business models, for example based on renting and sharing, have a significant market share. The buyer gets reliable information about the products, raw materials, their origin and environmental impact, as well as the different stages of manufacturing and social sustainability.

Image: Sini Suomalainen, Finix



Key themes

- Business models based on selling low-quality products in high volume and encouraging multiple purchases are not suitable for the circular economy.
- How to implement circular economy business models in practice?
 - Renewal, Sharing platforms, Product as a service, Extending the product life cycle, e.g. repair and update services, reuse, resource efficiency and recycling
- Renewal of the philosophy of consumption: High-quality, adaptable, long-lasting and multi-purpose clothing is the goal
- Ecosystem development

Key actors

- **Industrial companies** must actively use recycled materials. If the pressure from **consumers** is not enough, mandatory legislation is needed.
- **National and EU-level policy makers and decision-makers** introduce incentives to increase the use of recycled materials in textile products.
- **Financiers** should be interested in activities that leave Finland with innovative work and value.



SALES

What actions are needed to reach the vision?

- One of the most important measures to achieve the vision is to improve the quality of clothes and textiles in the EU region. The high quality and durability of the products is a basic requirement for many circular economy business models, as the starting point of the models is to keep the products in the economy's material cycles for as long as possible. For example, extending the product life cycle with repair services or offering an extended product warranty is not possible if the product life cycle is originally designed to be short. At the EU level, a minimum quality requirement for clothing is needed, with which low-quality textiles can be completely excluded from the market. Information about the wear resistance of the products must be communicated clearly.
- In Finland, the public sector must support companies that manufacture high-quality products and engage in circular economy business by favoring them in public procurement, by influencing the pricing of clothing through financial and other means of control. In addition, obtaining business subsidies and development grants for circular economy business must be made easier. Companies must be financially encouraged to switch to circular economy business models and offer subsidies that reduce the transition risk.
- Information about textile products must be unified and standardized at the EU level so that sharing information and material is easy and cost-effective. It is important to develop and introduce an EU-level digital product passport, which has already been designed as part of the sustainable products initiative. Companies, research institutes and universities must cooperate and develop electronic tracking systems (track & trace) and digital information platforms that can be used to share product information.
- Training places in the textile sector must be increased and more young entrepreneurs and experts in the commercial sector and digitalization must be attracted to the sector. Consumers must be encouraged to buy circular economy products and services, for example by reducing their value added tax. Companies, the public sector and non-governmental organizations should also influence consumers' perceptions of recycled clothes and increase awareness of circular economy services and products. A lot of used clothes are already bought, but using them should be made even more popular and common, as well as renting clothes. Companies can increase the demand for circular economy products and services with their marketing, but consumers' choices and purchasing decisions can also be influenced by public and third sector communication.



USAGE

Where will we be in 2030?

Consumers prefer the longevity of the products and buying new ones is decreasing. There are many opportunities to fix, repair or share a product. Products have value in the secondary market, for example in resale and buy-back services. At the end of the life cycle, it is easy for the consumer to recycle the product.

Image: Anne Kinnunen, Aalto university



Key themes

- Extending the service life and multiplying the times of use.
- Possibilities for users: repair, maintenance, rental, reuse and ease of recycling.

Key actors

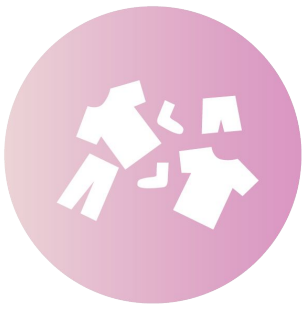
- **In schools**, children should already be taught everyday life according to the circular economy, which favors a long life cycle and the circulation of products.
- **The media** and influencers should look for new ways to encourage thoughtful purchases, product longevity and reducing consumption, even if their own funding depends on it.
- **Legislators** support the longevity of products with financial means, such as reducing the value added tax on repairs.



USAGE

What actions are needed to reach the vision?

- Extending the life cycle of a textile product plays a key role in reducing the product's environmental impact. The consumer can wear high-quality clothes for longer, buy only what is needed and buy used. Clothes must be repaired and maintained.
- Reuse, second-hand acquisition, rental, maintenance, repair and tuning are prioritized measures compared to buying and recycling a new and short-lived product. Companies in the textile industry participate in other stages of the product's life cycle than the sales stage, by offering, for example, multi-purpose facilities with services and guidance as well as services to extend the life of textile products.
- The use of the services requires an increase in the value and appreciation of the clothes. The end user must take care of the maintenance of the product and, at the end of the product's life cycle, also the recycling of the product.
- Different consumers need information and experiences to support their choices. It should also be packaged well: Versatile communication and visually clear and reliable indicators or certificates and signs guide the consumer's decision-making.
- The use of clothing rental companies, second-hand shops, peer-to-peer trade and recycling should become more common. Clothes should be used several times on average.
- Online shopping is increasing, and in the future, means will be needed to avoid returns (measurement information, digital matching). This needs to be supported and developed with the help of artificial intelligence applications.
- The consumer understands and accepts that responsibly produced products are more expensive than those that are produced by exploiting workers and the environment. The consumer of the future values quality and responsibility over quantity. Consumers should be ready to pay for socially and environmentally sustainable products and they should demand these.
- When consumers wear their clothes longer or recycle their products, the products get more uses. Finally, it is the responsibility of the owner of the product to recycle the garment into reusable or reprocessed material.
- The companies offer information and responsible services that help consumers reduce their carbon footprint. With the help of information, the end user's choices and attitudes are influenced.
- The companies offer repair and modification services as well as recycling services to enable the product to remain in use for a long time and to take care of the end of the product's life cycle. Various pawn services could also come into question.
- Companies participate in the second-hand market of their own high-quality products.
- Companies offer digital fitting services for new clothes to make it easier to find suitable products. and buying second-hand clothes also on digital platforms.
- The government and companies also need guidance to improve the world of values, so that responsibility becomes more important to consumers. Support is needed to change consumption habits. Legislation and economic control measures must guide the change.
- The Board of Education can include consumer education in the curriculum. The content of school education can influence children, as can already be seen, for example, in home economics education.



COLLECTION AND SORTING

Where will we be in 2030?

New legislation and textile imaging, identification and traceability technologies enable large-scale and high-quality textile collection and sorting. Sorting takes into account the needs of the following steps. The goal is to utilize it in accordance with the highest possible added value.

Image: Sini Suomalainen, Finix

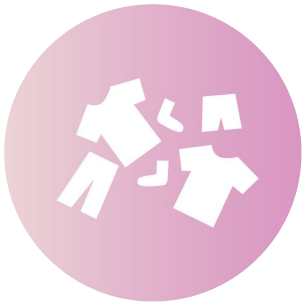


Key themes

- How and where is the collection organized?
- What should be considered in connection with transport logistics?
- Will the activities of the collecting organizations change?
- Are disposable textiles also brought to Finland from abroad?
- Automation of sorting
- Utilization of usable textiles in reuse
- Linking the information to the product
- Identification of materials and open data
- Identification and traceability in the collection of waste textiles
- Digital tracking and identification technologies

Key actors

- **Companies** use recycled materials significantly more extensively and innovatively than at present.
- **Waste authorities** organize the collection locally, using organizations.
- **Universities** and **companies** invest in the development of identification technologies.
- **Waste facilities** communicate to consumers how textile recycling is implemented for them.



COLLECTION AND SORTING

What actions are needed to reach the vision?

- Accurate identification of materials is a prerequisite for efficient recycling. Pre-sorting must be done close to the collection point to avoid unnecessary transport and contamination. It is especially important to recover usable clothes as they are. Southwest Suomen Jätehuolto has prepared sorting instructions for manual sorting, which can be used at collection points.
- The more precisely the market for different fiber types can be identified, the more efficiently sorting and logistics can be implemented. Every industrial textile user must find out whether it is possible to use recycled material and whether there is a real obstacle to it. The automation of sorting is a prerequisite for the profitable utilization of scrap textiles. The utilization of machine vision in sorting, also in the identification, pricing and sales of usable textiles, should be further developed both in universities and companies.
- Finland is a pioneer in the processing of discarded textiles, but the collection amounts are small at the national level. Finland should focus on developing and commercializing technologies for the development of new materials that enable the processing of a wide variety of textile pulps, and on the other hand, on identification technologies that support the filtering of unsuitable pulp in advanced processes.



SUOMI-EU -VISIO

Where will we be in 2030?

Finland is a visible and active player on the EU textile map and acts as one of Europe's circular economy centers for textiles.

Image: Sini Suomalainen, Finix



Key themes

- Finland as an active influencer and operator in the EU and globally
- Curbing fast fashion, promoting the quality of textiles and the circular economy
- Setting concrete goals and moving them forward and following them
- How to ensure the promotion of the legislation as a whole, taking into account the overlapping of parallel policy measures?
- Strengthening sustainable textile business in Finland; how to generate investments and added value from sustainable solutions

Key actors

- Key stakeholders in the textile sector; **companies, research institutes, authorities, decision-makers, STJM** and **researchers** participate in the EU's textile strategy work in workshops, by conducting research, taking initiatives and giving feedback.
- **European Parliament** and **European Commission**



FINLAND-EU VISION

What actions are needed to reach the vision?

- By participating in the EU-wide textile strategy work, Finland solves cross-border sustainability challenges and the structural problems of the sector and combats climate change. Limiting the generation of fast fashion, consumption and waste, or increasing the reuse and recycling of textiles and securing clean material cycles are important goals for Finland in joint strategic work. In addition, Finland wants to influence the conditions for generating added value in the strategy through new circular economy technology innovations, investments and business concepts. Moving these goals forward requires setting concrete goals and supporting and monitoring their realization.
- At the same time, the preparation of regulations promoting the sustainability of textiles and the circular economy in accordance with the EU's textile strategy and other policy measures (e.g. eco-design directive, ban on burning unsold and returned textiles, digital product passport, extension of producer responsibility to textiles, EU ecolabel, GPP Green sustainable procurement, PEF environmental footprint) will be influenced, to the ambition and implementation of their content. Finland openly shares its information and experiences regarding the separate collection of textile waste, which was started earlier than the schedule required by the waste directive.

FOR MORE INFORMATION

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