

European Policy Strategies for Textile Product Life Extension: Current Implementation and Challenges

Anubhuti Bhatnagar^(a), Arun Chandra Manivannan ^(b), Kirsi Niinimäki^(a)

a) Department of Design, Aalto University, Espoo, Finland

b) University of Newcastle, Callaghan, New South Wales, Australia

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Abstract: European policies are evolving to extend the lifespan of textiles and reduce waste, but challenges remain in implementation. This study examines how policies have shifted from voluntary measures before 2020 to stricter regulations, such as the Eco-design for Sustainable Products Regulation and Extended Producer Responsibility schemes. While these policies aim to make textiles more durable, most still focus on managing waste rather than preventing it. A key challenge is the lack of repair infrastructure and inconsistent enforcement across countries. Additionally, current policies sometimes prioritize recyclability over longevity, which can lead to unintended consequences like shorter product lifespans. Policies must better support durability through financial incentives, clearer design standards, and better enforcement to make a real impact. Investing in repair and reuse infrastructure alongside recycling efforts will be essential for creating a genuinely circular textile economy.

Introduction

The expanding textile sector increases access to affordable clothing, drives material innovation, and creates jobs globally. However, this growth has significant environmental and social impacts. The industry contributes 3% to 10% of global greenhouse gas emissions, 9% of ocean microplastic pollution, and consumes nearly 215 trillion liters of water annually (United Nations Environment Programme, 2023). Competitive pricing often undermines fair wages and safe working conditions (EEA, 2022).

With post-consumer textile waste (PCTW) expected to rise by 60% by 2050 (Salmenperä, 2023), transitioning from a linear economy to a circular economy is essential. CE replaces the 'end-of-life' concept with reducing, reusing, recycling, and recovering materials (Kirchherr et al., 2017). It can function through various value retention loops, as shown in Figure 1, though the industry prioritizes recycling over reuse, repair, and durability.

Several European countries have enacted policies to extend textile product life by promoting repairability, durability, and responsible end-of-life recycling. The Eco-design for Sustainable Products Regulation (ESPR) establishes binding requirements for durability, repairability, and recyclability, ensuring textiles are designed for longevity.

Extended Producer Responsibility (EPR) schemes shift waste management responsibility to producers, incentivizing recovery, reuse, and recycling.

This paper examines European policies and their evolution over the past two decades, focusing on how they extend the lifespan of textile products and the challenges in achieving a circular economy.

Methodology

This paper qualitatively reviews textile waste prevention and management policies, covering clean, pre-consumer, and post-consumer waste. Management strategies aim to reduce waste in production, processing, and post-consumer phases through optimized raw material use, promoting durability, repair, reuse, and improved waste collection and recycling. A quantitative assessment of policy impacts was not conducted because many initiatives were not fully implemented. Policies were identified through desktop research and literature reviews using Web of Science and Google Scholar, excluding indirectly linked proposals such as microplastic filtration regulations. Table 1 (see appendix) lists the reviewed policies.

Policies were classified by focus: strategies (general frameworks), legal frameworks (legally

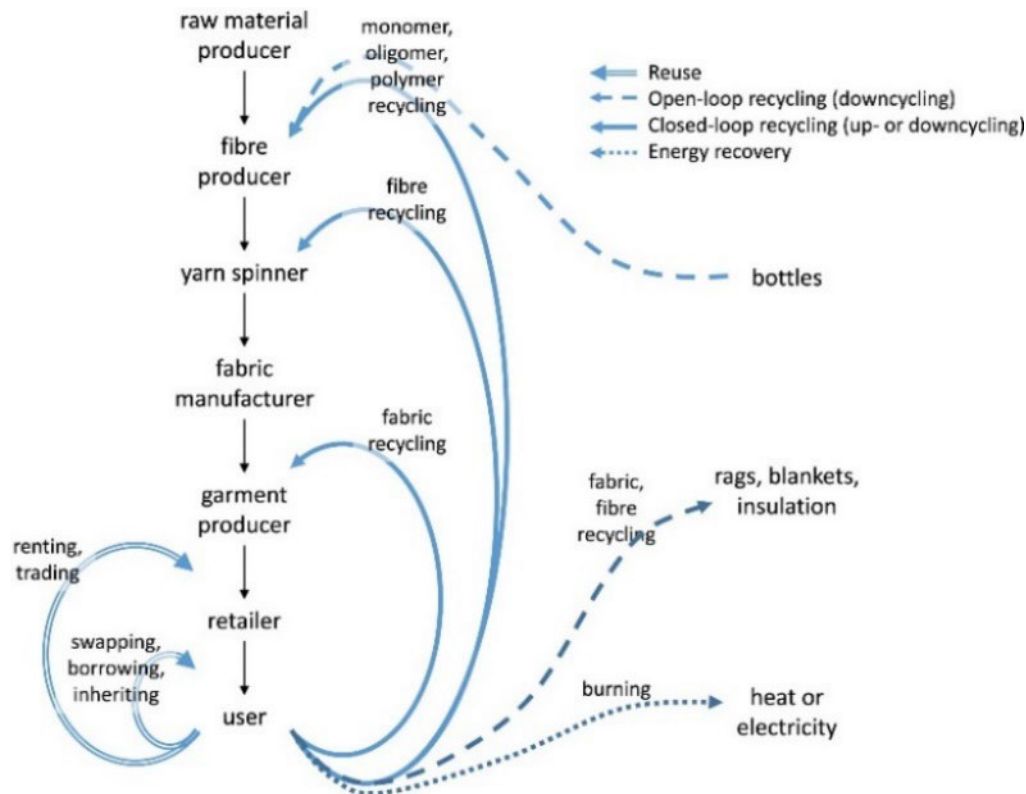


Figure 1. Circular activities within the textile value chain (Source: Sandin and Peters (2018))

binding with penalties), and incentives (financial or non-compulsory encouragement).

To assess effectiveness, policies were categorized by intensity: low-intensity (general guidelines), moderate-intensity (non-mandatory targets), and high-intensity (mandatory measures like eco-design mandates).

Policies were mapped to life cycle stages:

- Beginning of life – Promoting eco-design, durability, and sustainable production.
- Use phase – Supporting repair schemes, resale, and consumer engagement.
- End-of-life management – Regulations for collection, redistribution, recycling.

The analysis evaluates the scope, effectiveness, and enforcement of policies, mainly whether fewer high-intensity policies yield better results than numerous low-intensity measures.

Results and discussion

Type and intensity of policies

Classifying policies from Table 1 based on targets shows that high-intensity policies (6 cases) include EPR schemes, bans on destroying unsold goods, environmental labeling, and the EU's ESPR. These policies

impose binding obligations on businesses and enforce accountability. Moderate-intensity policies (7 cases) involve national strategies, waste prevention plans, and voluntary commitments. While influential, they rely more on industry cooperation and policy guidance than strict enforcement. Low-intensity policies (2 cases) focus on financial incentives such as VAT reductions, which encourage sustainable behaviors without mandating them.

The timeline of policies shows a clear progression from voluntary and incentive-based approaches to regulatory enforcement. Apart from France's EPR in 2007, there were no legal frameworks pre-2020, with most policies being non-binding strategies and incentives to encourage sustainable practices without strict enforcement. At this stage, governments prioritized awareness-building and financial incentives over regulation, reflecting an initial, business-friendly approach to sustainability, promoting voluntary participation, and providing a nudge to consumers toward circularity. Incentive-based approaches were common, offering tax reductions and financial support for repairs and donations. For example, Sweden's VAT Reduction on Repairs (2016) lowered the tax rate on repair services. Belgium's VAT

Exemption on Unsold Non-Food Products (2019) encouraged companies to donate rather than discard goods. These policies had low intensity because they relied on voluntary adoption rather than mandates. Some moderate-intensity strategies emerged during this period, such as Luxembourg's Textile Collection and Charity Reuse System (2017) and Czechia's Waste Act (2019), which set national targets for waste reduction but lacked stringent enforcement mechanisms.

Post-2020, the focus shifted toward high-intensity policies related to product design and material sustainability that could prevent waste before it occurs. Governments introduced stronger regulatory measures such as France's Anti-Waste Law (2020), the Netherlands' EPR (2023), and the EU's ESPR (2024). These policies impose mandatory targets, transparency requirements, and producer accountability. Additionally, high-intensity legal frameworks such as the Unfair Commercial Practices Directive (2024) mandate consumer transparency regarding durability and recyclability, signaling a move away from greenwashing and toward enforceable sustainability claims. France took a leading role, introducing the Anti-Waste and Circular Economy Law (2020), which banned the destruction of unsold goods, with financial penalties for non-compliance. Latvia and the Netherlands also established EPR frameworks, making textile producers responsible for waste management. Incentives have more targeted and high impact, such as France's Repair Fund (2022) and Austria's Repair Bonus (2022), which directly subsidized repair costs rather than offering broad tax reductions. Strategies also matured into enforceable national action plans. For instance, Denmark's Action Plan for Circular Economy (2023) introduced municipal obligations for textile sorting, and Finland mandated separate textile waste collection (2023), moving from general waste management to specific, measurable targets. At this stage, countries moved from encouraging circular practices to requiring them, demonstrating policy tightening and a stronger regulatory push for sustainability. This trend suggests a policy tightening over time, where governments first encourage best practices before making them mandatory.

Mapping policies based on product life stage

Based on the policies in Table 1, the European countries target textile waste management across various life cycle stages, mainly focusing on end-of-life and use phases. For instance, strategies like Denmark and Austria's "Action Plan for Circular Economy," Finland's "Textile Waste Separate Collection," and Latvia's National Waste Prevention Program show a recognition that circularity is not just about recycling but extending product lifecycles, promoting reuse, and repairing textiles during their use phase (Milios, 2018). A consistent goal across several initiatives is setting textile recycling targets (Puglia et al., 2024), particularly in the Netherlands and Czechia. These ambitious targets aim for fibre-to-fibre recycling or high percentages of textile waste to be recycled by 2025 and beyond. This reflects growing pressure to create closed-loop systems that reduce reliance on virgin resources. Countries like France, the Netherlands, and Latvia have adopted EPR schemes that require producers to take responsibility for the entire lifecycle of textiles, from production through to disposal and recycling, which implies designing products that are not only long-lasting but also easier to recycle, which may involve a shift in manufacturing processes and supplier relationships.

Incentives like Austria's "Repair Bonus Incentive," Sweden's VAT reduction on repair, Belgium's VAT exemptions on donated goods, and France's Repair Fund demonstrate a common strategy of encouraging the repair and reuse of textiles and also signal a shift towards encouraging a more responsible consumer mindset, where donations and second-hand usage are promoted over the purchase of new products. The rise of environmental labeling is also an apparent move to engage and educate consumers about the environmental impact of products to shift consumer behavior towards more sustainable choices. For instance, the environmental labeling in France's Climate & Resilience Law emphasizes transparency, making the environmental impacts of textiles more visible to consumers, which can influence purchasing behavior.

From Table 1, it is also evident that fewer countries target the beginning of life phases such as design and manufacturing. For instance, the Netherlands' "National Circular Economy Programme" mandates sustainable

materials and recycling at the design stage, reflecting a holistic view of circularity. These policies generally rely on setting mandatory standards for textile production, waste management, and recycling to ensure the industry adheres to specific, enforceable targets. However, the shift toward eco-design regulations suggests a growing recognition of the importance of sustainable materials and product longevity.

Challenges with policy targets and implementation

Standardized definitions and policy alignment: A major challenge in extending textile product lifespan is the lack of standardized definitions for key circularity concepts like durability, repairability, and recyclability. Inconsistent policy enforcement and industry compliance stem from a lack of harmonized understanding across the EU. Textile stakeholders stress the importance of clear distinctions between closed-loop and open-loop recycling, upcycling, and downcycling to ensure policies truly support product longevity, not just waste diversion (Textile Recycling Excellence Project, 2025). Additionally, current eco-design requirements that favor mono-material compositions for recyclability may unintentionally compromise durability and functionality, showing the need for balanced regulations prioritizing recyclability and long-term product use.

Circularity in design and manufacturing: The ESPR is key in shaping sustainable textile design, mandating durability, repairability, and reduced environmental impact. However, policies enforcing recycled content quotas must also consider material longevity to prevent unintended product degradation. Without this balance, efforts to create circular textiles may lead to shorter product lifespans, undermining sustainability goals (Textile Recycling Excellence Project, 2025).

A similar challenge exists within EPR schemes, which often prioritize end-of-life collection over extending product usability. Shared EPR costs among producers further reduce incentives for individual brands to invest in durability. To address this, eco-modulation fees could reward longevity, as seen in France's financial penalties for non-compliance and The Netherlands' ambitious reuse targets. However, for real impact, policies must promote recycling and enforce durability standards to ensure long-lasting, sustainable textiles.

Challenges in infrastructure and textile recycling's role in longevity: A significant barrier to textile longevity is the lack of large-scale repair and reuse infrastructure. Current waste management emphasizes recycling targets without adequately supporting textile reuse and repair. Although bans on textile waste destruction aim to keep materials in circulation, textiles may still become waste without investment in refurbishment and second-hand markets (Charnley et al., 2024). Additionally, the high cost of recycled fibers discourages textile-to-textile recycling, which could extend product life by converting old textiles into high-quality new ones (McKinsey & Company, 2022). Financial incentives for recycled fibers could enhance circularity. National laws like Finland's textile waste collection law and Denmark's circular economy strategies are promising, but their impact relies on broader policies that promote product life extension before recycling.

Repairability, Durability, and Extended Product Lifespan: One of the most direct policy levers for extending textile product lifespan is incentivizing repair and reuse. Current industry practices often prioritize cost efficiency over repair-friendly design, making it difficult for consumers to keep products in use longer (Korsunova et al., 2023). Policies promoting modular design, standardized replacement components, and third-party repair integration could significantly prolong textile usability. Policymakers could also consider subsidies or tax reductions for repairable textile designs, similar to existing initiatives in the electronics sector.

Several high-intensity policies encourage repairability, such as Austria's Repair Bonus Incentive, Sweden's VAT reduction on repairs, and France's Repair Fund. These initiatives demonstrate the effectiveness of financial incentives in encouraging consumer participation. However, their impact could be broadened beyond consumers to industry obligations, ensuring that brands integrate repairability features into product design from the outset.

Despite these initiatives, the voluntary nature of many consumer-driven policies limits their effectiveness. Stronger policy mandates for durability assessments, standardized repairability scoring, and manufacturer accountability could significantly shift industry norms toward longer-lasting products.

Another challenge is the lack of reliable data on product durability and consumer usage patterns, making it difficult to assess and extend product lifetimes (Textile Recycling Excellence Project, 2025). A standardized durability assessment framework could enhance transparency, allowing brands to communicate product longevity metrics and reinforcing consumer trust in sustainable purchasing decisions.

Addressing gaps in standardized definitions, design incentives, infrastructure investment, and reparability mandates is critical to ensuring that policies effectively promote longer-lasting textiles rather than just reducing textile waste. By shifting policy intensity toward durability and reuse, the EU can strengthen textile circularity while ensuring products stay used for as long as possible.

Conclusion and future outlook for the circular textile economy

The overview of policies shows that the European textile sector could be moving from waste management toward sustainable production and circularity, with increasing legal enforcement over time. Countries first introduce voluntary measures and financial incentives before enforcing stricter regulations, particularly in higher-income nations. However, end-of-life waste remains the primary focus, with design-stage interventions still emerging. Future policy developments will likely involve more stringent eco-design requirements, extended producer responsibility, and material transparency mandates to create a genuinely circular textile economy. Regulatory efforts by European countries are trying to ensure that textile products can last longer without compromising their usability and recyclability, and simplifying these frameworks and ensuring transparency will be critical to their long-term success.

Achieving systemic change requires improved policy coherence, investment in infrastructure, and more vigorous enforcement mechanisms. First, this can be done by strengthening enforcement mechanisms for high-intensity policies to ensure uniform compliance across member states. Second, increasing investment in recycling and repair infrastructure ensures that EU policies are supported by the physical and organizational capacity to implement them effectively. Third, consumer incentives and engagement should be enhanced by integrating repair services into mainstream retail practices and aligning policies with circular economy

principles. Fourth, providing regulatory stability by establishing precise long-term policy trajectories that allow businesses to plan and innovate confidently

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Appendix

Table 1. Policies promoting extended product lifetime in the EU and individual member states (Abbreviations: Beginning-of-Life (BoL), End-of-Life (EoL), Use Phase (UP))

| Name | Country | Description | BoL | UP | EoL | Type | Year | Intensity | Source |
|--|---------|--|-----|----|-----|-----------------|------|-----------|--|
| Action Plan for Circular Economy | Austria | Transitioning to a circular economy for textiles focuses on extending product life, promoting reuse, and increasing circular material use. | × | ✓ | ✓ | Strategy | 2021 | Moderate | (Federal Ministry Republic of Austria, 2020) |
| Repair Bonus Incentive | Austria | Refund citizens up to 50% of repair costs (up to €200) | × | ✓ | × | Incentive | 2022 | High | (Müncheberg, 2024) |
| VAT exemption on unsold non-food products | Belgium | VAT Reduction on donated products | × | × | ✓ | Incentive | 2019 | Low | (Roberts et al., 2023) |
| 541/2020 Coll. on Waste (Waste Act) | Czechia | Czechia aims to recycle 55% of municipal waste by 2025, 60% by 2030, and 65% by 2035. | × | × | ✓ | Strategy | 2019 | Moderate | (Smejkalová et al., 2024) |
| Action Plan for Circular Economy | Denmark | Encourage textile sorting from waste for reuse or recycling, managed by local municipalities. | × | ✓ | ✓ | Strategy | 2023 | Moderate | (Ministry of Environment of Denmark, 2021) |
| Finnish Law on Textile Waste Separate Collection | Finland | Collect textiles for reuse and recycle non-reusable waste. | × | × | ✓ | Strategy | 2023 | Moderate | (Zero Waste Europe, 2022) |
| Extended Producer Responsibility (EPR) | France | Minimize textile waste via recycling, reuse, and sustainable materials from producers. | × | × | ✓ | Legal Framework | 2007 | High | (Roberts et al., 2023) |
| Anti-Waste and Circular Economy Law | France | Ban on destroying unsold goods; non-compliance incurs up to 15,000 EUR penalty. | ✓ | ✓ | ✓ | Legal Framework | 2020 | High | (Roberts et al., 2023) |
| French Climate & Resilience Law – Environmental Labelling for Products | France | Mandatory environmental labeling for textiles and footwear shows impacts like greenhouse gas emissions and resource use, ensuring consumer transparency. | ✓ | ✓ | ✓ | Legal Framework | 2023 | High | (Lüttin, 2024a) |
| Repair Fund | France | Up to 20% discounts on out-of-warranty repairs, financed through EPR fees. | × | ✓ | ✓ | Incentive | 2022 | High | (ReFashion, 2021) |
| "Duty of Care" under the Circular Economy Act | Germany | Prioritize waste prevention to support circular economy goals. | ✓ | ✓ | ✓ | Strategy | 2020 | Moderate | (BMUV Germany, 2020) |
| National Waste Prevention Program | Latvia | Integrate waste prevention for textiles through reuse, repair, and circular strategies, supporting textile and footwear repair. | × | ✓ | ✓ | Strategy | 2021 | Moderate | (MoSARDR Latvia, 2021) |
| Producer Responsibility Scheme for Textiles and Footwear | Latvia | Enhance textile recycling, promote eco-friendly manufacturing, and develop recycling infrastructure. | × | × | ✓ | Legal Framework | 2023 | High | (Lizenzero, 2024) |

| Name | Country | Description | BoL | UP | EoL | Type | Year | Intensity | Source |
|---|--------------------|--|-----|----|-----|-----------------|------|-----------|---|
| Textile Collection and Charity Reuse System | Luxembourg | Collect textiles for charity and enhance reuse. | × | × | ✓ | Strategy | 2017 | Moderate | (Ville De Luxembourg, 2022) |
| VAT Reduction on Repair | Sweden | Reduced VAT (6% in 2022) for minor bicycle, clothing, and shoe repairs. | × | ✓ | × | Incentive | 2016 | Low | (Puglia et al., 2024) |
| EPR | The Netherlands | At least 50% of textiles must be recycled or reused by 2025, reaching 75% by 2030. Fiber-to-fiber recycling must reach 25% by 2025 and 33% by 2030. | × | × | ✓ | Legal Framework | 2023 | High | (Government of the Netherlands, 2020) |
| National Circular Economy Programme | The Netherlands | Use 50% sustainable textiles by 2025 and recycle 100% non-reusable textiles by 2030. | ✓ | × | ✓ | Strategy | 2023 | High | (Government of the Netherlands, 2020) |
| Textiles 2030: UK Sustainable Textile Action Plan | The United Kingdom | Cut carbon and water footprints in textiles by 50% and 30% by 2030 through circular business models. | ✓ | × | ✓ | Incentive | 2021 | Moderate | (Department for Environment Food & Rural Affairs, 2023) |
| Circular Fashion Program | The United Kingdom | A £15 million fund aims to enhance circularity in fashion and textiles, emphasizing sorting, recycling, innovation, and research to adopt scalable models by 2032. | × | × | ✓ | Strategy | 2022 | Moderate | (Department for Environment Food & Rural Affairs, 2023) |
| Interdisciplinary Textiles Circularity Centre | The United Kingdom | A £5.4 million initiative to enhance innovation in renewable textile materials, focusing on post-consumer products and household waste feedstock. | ✓ | × | ✓ | Strategy | 2022 | High | (Department for Environment Food & Rural Affairs, 2023) |
| Eco-design for Sustainable Products Regulation | The EU | Framework for eco-design requirements to enhance product durability, repairability, recyclability, and manage hazardous chemicals. | ✓ | × | ✓ | Legal Framework | 2024 | High | (Lüttin, 2024b) |
| Waste Framework Directive | The EU | Establishes waste management definitions, requires member states to separately collect textile waste by January 2025, and promotes EPR schemes as an economic tool. | × | ✓ | ✓ | Legal Framework | 2023 | Moderate | (Lüttin, 2024b) |
| Unfair Commercial Practices Directive | The EU | Empowering consumers by tackling unfair practices and ensuring product transparency in durability, reparability, and recyclability. | ✓ | ✓ | ✓ | Legal Framework | 2024 | High | (Lüttin, 2024b) |
| Regulation on the registration, evaluation, authorization, and restriction of chemicals | The EU | Regulating chemical production and disposal protects human health and the environment. Firms producing or importing over 1 tonne of chemicals annually must register with the European Chemicals Agency to ensure safe management. | ✓ | × | ✓ | Legal Framework | 2021 | High | (European Commission, 2021) |