Challenges of New Regulations and Strengths of Eco-Credential Standards in the UK's Textile and Fashion Industry

Prof. Effie Kesidou and Dr. Celinda Palm

University of Leeds | Leeds University Business School

Executive Summary

In this study we examine how international regulatory frameworks influence the effectiveness of eco-credential standards within the UK's Textile and Fashion Industry (TFI). The UK's strong commitment to sustainability, combined with a highly aware consumer base, positions it uniquely to lead in aligning eco-credential standards with evolving global regulations.

Our analysis reveals a global regulatory shift from general environmental protection toward more comprehensive, circularity-focused policies. Notably, circular end-of-life management has become the most legislated area, particularly at the retail and waste management stages. While this signal growing policy commitments to waste reduction and producer accountability, significant regulatory gaps persist in downstream activities, especially at the consumer use phase. Key aspects such as product care, longevity, and disposal remain largely unregulated, undermining ecolabels' ability to influence consumer behaviour and weakening their overall lifecycle impact.

Additionally, while robust regulations govern firms' environmental reporting, there is a lack of comparable frameworks for tracking post-consumer textile disposal. Without enhanced reporting systems, it remains difficult to evaluate the true effectiveness of ecolabels across the full product lifecycle.

Moreover, despite leading firms in the TFI projecting growth through increased volumes rather than prices (McKinsey & Company, 2025), current regulations fail to address how this expansion can be aligned with sustainability goals. This represents a missed opportunity to leverage consumer demand for more sustainable textile fashion through regulatory frameworks that promote responsible consumption and production patterns.

Given the UK's evolving post-Brexit regulatory landscape, there is a strategic opportunity to harmonise ecolabel criteria with domestic and international sustainability regulations. Strengthening regulatory support at the consumer use and end-of-life stages, improving transparency through comprehensive reporting, and embedding sustainability throughout the value chain could not only enhance ecolabel credibility but also position the UK as a global benchmark for sustainable practices in the TFI.

We recommend four key actions to create a regulatory environment that strengthens ecolabels' eco-credentials in the UK TFI and beyond:

◊ **Align material choices, consumer behaviour, and circular end-of-life management across the value chain**: To boost the effectiveness of ecolabels, policies must harmonise material choices, consumer behaviour, and circular end-of-life management throughout the entire value chain.

◊ **Support circularity certifications**: There is a need for greater regulatory support for circularity certifications, particularly at the consumer use and end-of-life phases. This support could include promoting transparency in recycling rates, improving product take-back schemes, and incentivising product designs that facilitate recycling.

◊ **Strengthen consumer-focused regulations**: Regulations promoting consumer behaviour should be reinforced, including standardised labelling and clear

guidance on disposal. Such measures would increase ecolabel credibility, reduce the prevalence of greenwashing, and encourage more sustainable consumption practices.

◊ **Leverage cradle-to-grave ecolabels and firm proactiveness**: Policymakers can capitalise on the growing adoption of cradle-to-grave ecolabels, reflecting a circular management approach. This trend demonstrates that firms are proactive, often responding to shifting consumer attitudes, anticipating future legislation, and moving faster than policymakers. By aligning regulatory frameworks with these proactive industry practices, policymakers can formalise circular management approaches while complementing voluntary ecolabel initiatives.

Glossary

EU Directive A legal act that sets a minimum standard for EU member states. Each member state must enact their own laws or regulations within a two-year period to comply with the minimum requirements of the directive. Member states can also choose to go beyond the minimum requirements set out in the directive.

Eco-credentials Standards that help firms enhance their environmental performance.

Ecolabels Voluntary self-regulation tools that indicate products (or processes) as environmentally preferable based on life-cycle considerations. Ecolabels signify that the product meets stated environmental and social criteria, thereby claiming it has less negative environmental (and/or social) impacts compared to similar products. Ecolabels with independently verified, credible, non-misleading information about the environmental impacts of products, differentiates products in the marketplace with an aim to promote more sustainable production and consumption practices.

EU Act Refers to any legal instrument that the EU institutions adopt to exercise their powers and implement EU policies. An EU act can be binding or non-binding, depending on their type, as such it can be a regulation, a directive, a decision, a recommendation or an opinion.

EU Legislation Various legal instruments such as directive, regulations and decisions, used by the European Union to achieve its policy objectives and ensure the smooth functioning of the single market. These instruments are binding on member states and their citizens

EU Policy An EU policy is a set of principles, rules, and guidelines that shape and direct the actions of the EU and its member states in various areas of public concern. It establishes a framework for consistent decision-making and implementation across the EU.

EU Strategy A plan of action designed to achieve specific objectives within a particular area over a defined period. It outlines the priorities, actions, and resources needed to reach desired outcomes.

Regulation A general law that applies to all EU countries. It's a binding act that every country must comply with.

Value chain The integration of all the activities involved in the creation and distribution of a product, from raw material sourcing to final consumer delivery

Value chain A series of business activities that generate value in the company to achieve a competitive advantage. Often begins with extraction and production of resources and stops with consumer sales or end-of-life

Value chain tier/sub-tier The different levels or stages in the production process, from raw material extraction to the final product reaching the consumer. Within each tier of the textile fashion value chain, there are sub-tiers that represent more specific processes and activities. For example, Tier 2: Yarn and Fabric Manufacturers, Sub-tiers: Spinning, Weaving/Knitting, and Dyeing and Finishing

Fast-fashion Low-cost textile apparel frequently updated in large retail chains

Acronyms

EU	European Union
UN	United Nations
TFI	Textile Fashion Industry
GVC	Global Value Chain

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1. Introduction

*The era of the fashion industry self-regulating sustainability is drawing to a
close around the world. Across jurisdictions, new rules could have a
widespread impact on both consumers and fashion players.*

(McKinsey & Company, 2023, p. 19)

In this report we examine the relationship between voluntary eco-credential standards and
international regulations, with a particular focus on the UK's fashion and textile industry. The
UK is an ideal context for this research due to its leadership in sustainability initiatives and
environmental policies, including its commitment to achieving net-zero carbon emissions by
2050. This commitment provides a robust framework for industries, including textiles, to
adopt and implement sustainable practices. Additionally, the UK market is characterised by
high consumer awareness and demand for sustainable textiles, which is further supported by
regulatory frameworks that feature internationally recognised ecolabels such as the Soil
Association Organic Standard and the Global Organic Textile Standard (GOTS).

An important impact of these regulations is the potential increase in firms' costs. Regulatory
changes often prohibit the use of "dirty" resources or technologies and mandate the adoption
of cleaner practices, which typically require adjustments to production or distribution
systems. Business owners generally resist regulations due to the perceived increase in costs
or restrictions on operational freedom. However, studies show that standards, such as
ecolabels, can help mitigate these challenges (Darnall et al., 2024). Ecolabels allow firms to
signal their sustainability commitments, enhancing their market access and profitability by
increasing their integration into global value chains (Kirchherr et al., 2018; Ranasinghe and
Jayasooriya, 2021; Thøgersen et al., 2010).

The economic significance of the UK's textile market, coupled with its prominent role in
international trade, underscores the relevance of this study. Furthermore, post-Brexit
regulatory changes offer a unique opportunity to explore the alignment—or divergence—
between UK and EU policies, and their implications for the textile industry. This leads to the
central question of our study: *How do eco-credential standards interact with both domestic
and international regulations?* We aim to identify synergies that promote environmental
sustainability or trade-offs that may hinder progress.

Our focus is on the global textile and fashion industry (TFI), with a particular emphasis on
the UK, and we specifically examine international and national regulations related to climate
change and textile waste. This focus is driven by the urgent need to reduce carbon emissions
to combat climate change, which affects all life forms on Earth. Circularity, recognised by
policymakers and stakeholders in the textile sector, is increasingly viewed as a key strategy
for minimising textile waste and environmental impact.

In summary, this study seeks to understand how international regulatory frameworks
influence the effectiveness of implementing eco-credential standards within the UK's TFI.
Our findings will offer valuable insights for improving sustainability management in global
value chains and advancing sustainable practices within the industry at large.

2. Literature review and Conceptual framework

2.1. Lead firms, global value chains, and regulations

Salminen and Rajavuori (2019) define lead firms as actors that govern a product or service by owning intellectual property, designing products, marketing, and making key decisions on production, whether in-house or outsourced. In the TFI, lead firms – primarily large fashion brands and dominant retailers – play a critical role in setting sustainability standards, influencing suppliers, and shaping sourcing practices across global production networks. In the UK TFI, retailers function as lead firms, coordinating value chain activities, driving sustainability initiatives, and determining which eco-credentials and regulatory standards suppliers must meet. Through their influence, UK lead firms impact both domestic and international suppliers, reinforcing sustainability expectations across global value chains (GVCs).

Hileman and colleagues (2020) illustrate how dominant lead firms in the TFI act as keystone actors – large transnational corporations with disproportionate influence over industries due to market consolidation and corporate power. These firms play a pivotal role in structuring GVCs and shaping sustainability commitments. In this context, UK retailers, as lead firms, do not merely function as economic entities but also as key coordinators of sustainability collaborations within the value chain. Their decisions on environmental standards influence suppliers across multiple jurisdictions, demonstrating the need for cohesive regulatory frameworks to ensure alignment across markets.

2.1.1. *Regulatory divergence and its impact on GVC operations*

After the UK left the EU (Brexit), regulatory divergence became a significant concern for GVC firms operating in both regions (Armstrong, 2018). The UK and the EU can now develop their own independent regulatory frameworks, which may not always align. This divergence poses challenges for lead firms in the TFI that operate across borders, particularly in maintaining consistent eco-credentials that comply with both UK and EU requirements. Differences in environmental standards create uncertainty for consumers, increase operational costs, and introduce legal risks for firms attempting to navigate multiple regulatory landscapes. While the UK aims to align with EU environmental legislation, this ambition remains subject to evolving policy decisions. For instance, the proposed Product Regulation and Metrology Bill (UK Parliament, 2025) suggests an effort to maintain regulatory coherence by facilitating updates to UK legislation in line with EU standards.

2.1.2. *Legislative drivers of sustainability in GVCs*

Regulatory frameworks play a fundamental role in shaping sustainability practices within GVCs. Climate legislation – such as emissions reduction targets, carbon pricing, and industry-specific climate action plans – acts as a catalyst for lead firms to adopt greener technologies and ensure compliance throughout the value chain (Kano et al., 2020). Given their position at the top of the value chain, lead firms have the capacity to set sustainability expectations for suppliers, thereby reinforcing environmental governance across multiple tiers (Salminen and Rajavuori, 2019).

In addition to climate policy, circular economy regulations – including recycling mandates, material reuse policies, and extended producer responsibility (EPR) schemes – are essential for minimising waste and improving resource efficiency. The literature emphasises that regulatory frameworks promoting circularity encourage firms to innovate and integrate

sustainable practices across their GVCs (MacCarthy et al., 2016). Without regulatory alignment, however, lead firms may struggle to implement consistent sustainability strategies across different markets, further complicating eco-credential claims.

2.1.3. *Transparency and accountability in GVCs*

Eco-labels and sustainability certifications serve as key tools for differentiating brands in the market. However, regulatory divergence challenges their credibility by creating inconsistencies in environmental claims. The "slipperiness" of GVCs – characterised by their complex, fragmented, and highly mobile nature – makes it difficult to enforce environmental standards universally (Salminen and Rajavuori, 2019). Lead firms can relocate production to jurisdictions with weaker environmental regulations or lower compliance costs, undermining stricter legislation elsewhere. This has led to growing pressure for international agreements and cross-border regulatory mechanisms to hold firms accountable for their entire GVC, regardless of where production occurs.

One approach to address regulatory gaps is through enhanced reporting requirements. Transparency laws requiring firms to disclose greenhouse gas emissions, sourcing practices, and environmental impacts improve accountability across GVCs (Kano et al., 2020). New legislation, such as the Ecodesign for Sustainable Products Regulation (EU) and California's Climate Corporate Data Accountability Act (US), compels firms to publicly report sustainability data. While lead firms still retain the ability to shift production for strategic reasons, heightened reporting obligations increase public scrutiny, reputational risks, and investor pressure, thereby reinforcing eco-credential commitments.

2.1.4. *The strategic role of eco-credentials in GVCs*

Eco-credentials are no longer just a compliance issue but a strategic imperative for international firms (Kano et al., 2020; Salminen and Rajavuori, 2019). The literature emphasises that market pressures, governance structures, and regulatory environments collectively shape the adoption and effectiveness of eco-credentials across GVCs. Consumer-driven demand for sustainability encourages brands to voluntarily exceed legal requirements, leveraging eco-labels as a means of differentiating themselves in the marketplace (Kesidou and Palm, 2024). This positions eco-labels as strategic tools rather than mere compliance mechanisms, enhancing brand reputation, increasing consumer trust, and reinforcing customer loyalty. However, without regulatory alignment, conflicting standards across jurisdictions risk weakening the credibility of eco-labels, potentially leading to consumer confusion and market fragmentation.

The GVC literature underscores the interconnected role of lead firms, regulations, and eco-credentials in driving sustainability within the TFI (Hileman et al., 2020). Regulatory divergence post-Brexit presents both challenges and opportunities for lead firms in the UK TFI. While independent policy development allows the UK to tailor environmental regulations to national priorities, misalignment with EU standards creates operational and reputational risks for firms operating across both markets. As lead firms navigate this evolving regulatory landscape, their ability to coordinate sustainability initiatives across GVCs will be critical in shaping the industry's long-term environmental impact.

2.2. International environmental and sustainability policies

International policy shape sustainability practices across global value chains. Globally, there are currently 1,998 environmental treaties in force, along with close to 200,000 pieces of environmental legislation (Ecolex, n.d.). Within the European Union, there are over 17,000 environmental treaties and legislations. There are several multinational jurisdictions and agreements such as the EU, United Nations (UN), World Trade Organization (WTO), Organization of American States (OAS), African Union (AU), Asia-Pacific Economic Cooperation (APEC), Mercosur, and North American Agreement on Environmental Cooperation (NAAEC). Apart from the EU, other multinational jurisdictions, such as the UN, WTO, and OAS, primarily establish voluntary frameworks or agreements that encourage compliance but are not legally binding, with the UN, for example, providing soft law that does not compel member states to adopt them. Countries voluntarily adopt these frameworks, and they subsequently influence national policies. This means that while countries are not legally compelled to meet the Sustainable Development Goals (SDGs) (United Nations, 2023), they have committed to pursuing their achievement.

Table 1 outlines key international agreements focused on environmental sustainability, climate action, and waste management. It spans selected milestones from the 1972 Stockholm Declaration, which in many ways initiated global environmental cooperation, to recent initiatives such as the EU Green Deal (2020) and the EU Strategy for Sustainable and Circular Textiles (2021). These frameworks highlight the evolution of global efforts in addressing environmental challenges, reducing emissions, promoting sustainable development, and more recently also supporting circular economies across industries.

Table 1. Key international and regional environmental agreements shaping sustainability governance in global value chains.

Agreement	Year	Context
UN Conference on the Human Environment (Stockholm Declaration)	1972	The first major global environmental summit, recognising the need for international cooperation to address environmental challenges. Laid the foundation for sustainable development policies.
Basel Convention	1989	Aims to regulate the transboundary movement of hazardous waste and prevent its disposal in developing countries. Strengthened global waste management and environmental justice.
United Nations Framework Convention on Climate Change (UNFCCC)	1992	Established the international framework for addressing climate change, leading to future agreements such as the Kyoto Protocol and Paris Agreement.
Kyoto Protocol	1997	A legally binding agreement under the UNFCCC that set emission reduction targets for developed countries, introducing carbon trading mechanisms.
Millennium Development Goals (MDGs)	2000	An UN-led framework of eight goals to tackle global challenges, including environmental sustainability (Goal 7), later succeeded by the Sustainable Development Goals (SDGs).

Stockholm Convention	2001	Aimed at eliminating or restricting persistent organic pollutants (POPs), addressing toxic chemicals that harm human health and ecosystems.
Paris Agreement	2015	A global commitment under the UNFCCC to limit global warming to well below 2°C, aiming for 1.5°C, with nationally determined contributions for emission reductions.
2030 Agenda for Sustainable Development (Sustainable Development Goals – SDGs)	2015	A broader successor to the Millennium Development Goals, consisting of 17 goals that integrate social, economic, and environmental sustainability, with a strong focus on climate action and responsible consumption.
EU Green Deal	2020	The EU's comprehensive strategy for achieving climate neutrality by 2050, with policies addressing emissions reduction, circular economy, and sustainable industries.
EU Strategy for Sustainable and Circular Textiles	2021	A policy framework aimed at reducing textile waste, promoting sustainable production, and encouraging circular economy practices in the fashion and textile industry.

Box 1. Circular economy in EU policy

The concept of the circular economy has gained traction among policymakers, TFI stakeholders, and scholars. Despite its growing popularity, circular economy has primarily been shaped by these communities, with scientific research on the topic still relatively underdeveloped (Corvellec et al., 2022). This study examines how the circular economy is defined and applied within EU policy.

The circular economy is a systemic approach to economic activity that benefits businesses, society, and the environment. It seeks to maintain a continuous flow of goods and services in ways that are socially and ecologically restorative by decoupling economic growth from environmental degradation and the consumption of finite resources, CE supports a transition to renewable materials and energy sources (Kirchherr et al., 2017).

The European Union defines the circular economy as an economic system designed to eliminate waste and maximise resource efficiency. The EU Circular Economy Action Plan (European Commission, 2020) states that the purpose of a CE is to "*maintain the value of products, materials and resources for as long as possible by returning them into the product cycle after they have reached the end of their lifecycle, while minimising the generation of waste*" This contrasts with the traditional linear economy, which follows a "take, make, dispose" model. Kirchherr and colleagues (2017) conceptualise nine "R" strategies involved in the transition from a linear to a circular economy, see Figure A. Among these, waste management (R8) receives increasing attention from policymakers and businesses. This is notable as while waste management is a necessary part of circular economy, it represents the lowest level of circularity.

Figure A. The 9R Framework. (reprinted from (Kirchherr et al., 2017, p. 224)

2.3.   The EU Strategy for Sustainable and Circular Textiles, 2021

The European Green Deal sets the overarching vision and ambitious targets for a sustainable and climate-neutral Europe by 2050. The overarching aim of the European Green Deal is ensuring no net emissions of greenhouse gases by 2050, economic growth decoupled from resource use and that no person, and no place is left behind. The initiative includes various types of EU acts such as regulations, directives, decisions, communications, and action plans. It functions both as a high-level strategy guiding the EU's climate and environmental policies and as a framework through which specific legislative and policy measures are implemented to achieve its ambitious goals. The EUs 8th Environment Action Programme (EAP) to 2030, aims to support the EU in meeting its commitments under the 2030 Agenda for Sustainable Development (SDG) by addressing environmental challenges that are critical to achieving the SDGs.

The Strategy for Sustainable and Circular Textiles (European Commission, 2022) is a key initiative under the European Green Deal, particularly within the context of promoting a circular economy and sustainable industry practices, aligning with the objectives of both the European Green Deal and the 8th EAP. In summary, the EU Strategy for Sustainable and Circular Textiles (European Commission, 2022, p. 2) aims to:

> *[...] create a coherent framework and a vision for the transition of the textiles sector whereby:*
> *By 2030 textile products placed on the EU market are long-lived and recyclable, to a great*
> *extent made of recycled fibres, free of hazardous substances and produced in respect of social*
> *rights and the environment. Consumers benefit longer from high quality affordable textiles, fast*
> *fashion is out of fashion, and economically profitable re-use and repair services are widely*
> *available. In a competitive, resilient and innovative textiles sector, producers take responsibility*
> *for their products along the value chain, including when they become waste. The circular textiles*
> *ecosystem is thriving, driven by sufficient capacities for innovative fibre-to-fibre recycling, while*
> *the incineration and landfilling of textiles is reduced to the minimum.*

Following circular economy's key principles, the Strategy for Sustainable and Circular Textiles seeks to minimise negative environmental impacts, including reducing greenhouse gas emissions, water and energy use, and chemical pollution, while encouraging sustainable practices in design, production, and consumption to extend product lifespan and reduce waste (European Commission, 2022). It supports the development of circular business models, increasing resource efficiency by promoting the use of secondary raw materials and reducing dependency on virgin resources. Key initiatives include introducing eco-design requirements to ensure textiles are durable, repairable, and recyclable, and phasing out hazardous substances to enhance safety and recyclability. The strategy also focuses on strengthening the market for sustainable textiles through for example enhancing consumer awareness and providing better product transparency and traceability via digital product passports. It encourages investment in innovative technologies and materials for sustainable textiles, supports small and medium-sized enterprises (SMEs) in adopting sustainable practices, and promotes international cooperation to establish the EU as a global leader in sustainable textiles.

In sum, the overarching aim of the EU strategy for sustainable and circular textiles is to mitigate the environmental impact of the textile sector by emphasising the importance of decoupling textile waste generation from the industry's growth (European Commission, 2022, p. 8).

2.4. Conceptual framework

In this study, we aim to understand the relationship between ecolabels and environmental and sustainability regulations. To structure our analysis, we categorise regulations using a framework inspired by the European Green Deal (European Commission, 2021). Our regulatory categories are drafted based on EU legislation, recognising that the EU holds an unparalleled regulatory influence, possessing "*unprecedented regulatory ability and power compared to both nation-states and international law regimes*" (Cornell and Sjåfjell, 2024). As such, EU regulations are among the most robust in creating binding legal frameworks that member states must follow. As outlined in the previous section, the EU Strategy for Sustainable and Circular Textiles aligns with the objectives of the Green Deal and the 8th Environmental Action Programme (EAP), reinforcing the EU's central role in shaping sustainability regulations within the textile sector.

The European Green Deal is structured around eight key priorities: Climate, Energy, Environment and Oceans, Agriculture, Transport, Industry, Research and Innovation, and Finance and Regional Development. To provide a more streamlined yet comprehensive framework for analysing environmental regulations and sustainability, we join these priorities into four broader regulatory categories that align with the EU Strategy for Sustainable and Circular Textiles (see Table 2). These categories are: (i) Climate, Emissions & Energy, (ii)

Circular End-of-life Management, (iii) Consumer Goods, Certification & Labelling, and (iv) Reporting. A more detailed description of each category follows below.

Table 2. Alignment of the EU Strategy for Sustainable and Circular Textiles (SCT) with Regulatory Categories.

EU Strategy SCT	Proposed Regulatory Categories	Alignment
Reducing Carbon Emissions & Resource Use	Climate, Emissions & Energy	This category captures regulations targeting carbon emissions, energy efficiency, and climate impact, which are crucial for mitigating the environmental footprint of textile production. The EU strategy's focus on reducing emissions and resource consumption directly aligns with our regulations in this domain.
Encouraging Circular Design & Recycling	Circular End-of-life Management	Regulations in this category capture waste reduction, product durability, and extended producer responsibility (EPR). Since the EU strategy promotes circularity by encouraging recycling and sustainable design, it falls under this regulatory category.
Strengthening Consumer Awareness & Labelling	Consumer Goods, Certification & Labelling	Consumer-facing policies regulate ecolabels, green claims, and product transparency. The EU strategy's objective of enhancing consumer awareness and improving ecolabel credibility fits within our regulatory category, as it involves standardising sustainability claims and preventing greenwashing.
Enhancing Reporting & Accountability	Reporting	This regulatory category captures corporate sustainability reporting, value chain due diligence, and disclosure requirements. The EU strategy's emphasis on improving industry accountability aligns with regulatory measures that mandate transparent reporting and enforce compliance with sustainability goals.

Note, while we group legislation in distinct categories, we emphasise that these regulatory categories are inherently interconnected, with many policies influencing multiple domains simultaneously.

Climate, Emissions & Energy: Legislation and regulations related to climate change, carbon emissions, and energy consumption are directly relevant to the TFI due to its carbon footprint across value chain activities. Categorising these legislations together matches the EU's climate action strategies, including the legislative Fit for 55 Package ("The European Green Deal - European Commission," 2021) and allows us to assess regulations that focus on reducing carbon emissions, improving energy efficiency, and promoting the adoption of renewable energy. The integration of energy and emissions regulations enables us to understand how energy-related laws, such as those focusing on energy efficiency and energy consumption reductions, may impact the TFI's carbon footprint. Since the consumption of energy – especially from fossil fuels – plays a central role in driving emissions, addressing both areas in a unified category helps us capture the full scope of regulatory efforts aimed at mitigating climate change.

Circular End-of-life Management: Regulations on end-of-life management reflect the EU's objectives of the Textile Strategy for Sustainable and Circular Textiles**.** It helps us to explore the waste management policies, recycling standards, waste prevention measures and the legal framework set to reduce or minimise textile waste including repair, reuse, recycling, and landfill/incineration.

Consumer Goods, Certification & Labelling: This category includes regulations governing the certification, labelling, and marketing of clothing items, particularly those related to consumer-facing sustainability claims, ecolabelling, and product standards for environmental considerations. Given the increasing interplay between mandatory regulatory frameworks and voluntary sustainability initiatives, our study focuses on how these regulatory mechanisms interact, complement, or create tensions between policy and action. Understanding this relationship is crucial for assessing the effectiveness of ecolabels.

Reporting: This category captures regulatory requirements for transparency, monitoring, and disclosure such as Corporate Sustainability Reporting Directive (CSRD). This helps us assess how regulations mandate firms to standardise their reporting on their environmental impacts that concern carbon emissions and waste.

Kesidou and Palm (2024) present a conceptual framework of four key dimensions to reduce information asymmetry and uncertainty and enhance ecolabel effectiveness. Their study builds on theoretical insights into information asymmetry and the uncertainty faced by both consumers and producers in the context of ecolabels. Their conceptual framework identifies four key dimensions – standardisation of environmental attributes, transparency in monitoring and certification, lifecycle and value chain consideration, and effective communication – each with sub-dimensions that enhance ecolabel effectiveness. Standardising environmental criteria helps clearer comparisons across labels, while increased transparency in verification processes, particularly third-party certification, strengthens credibility. A lifecycle-based approach ensures ecolabels capture the full environmental impact of products, and effective communication strategies help tailor ecolabel information for different audiences. By addressing these dimensions, Kesidou and Palm's framework can be used to enhance ecolabel transparency, comparability, and trustworthiness, to better inform consumer decisions and value chain management.

We are exploring how ecolabels interact with different regulatory categories, as illustrated in Figure 1. By integrating the key dimensions from Kesidou and Palm's framework with our regulatory categories, we establish a structured approach to understanding how environmental policies shape ecolabel attributes. This helps us to examine how regulations link to standardisation, transparency, lifecycle considerations, and communication of ecolabel information within the UK's TFI.
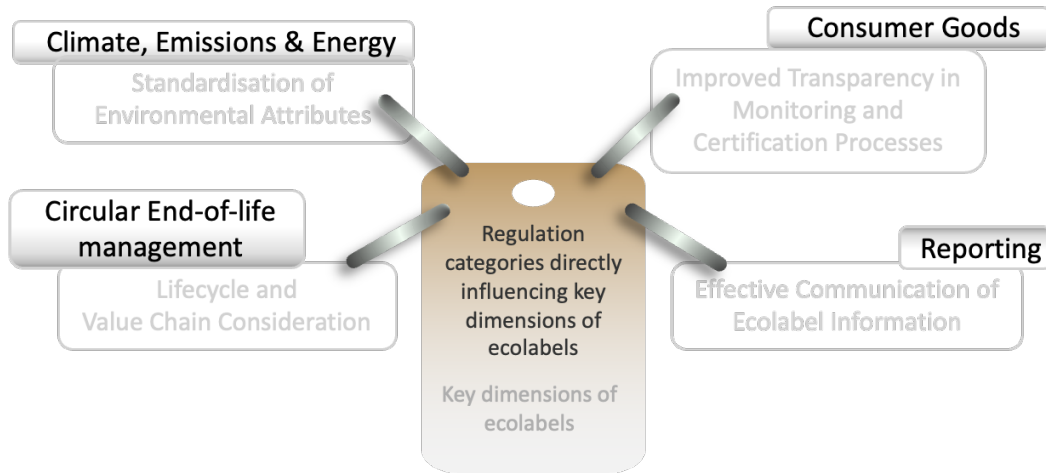
Figure 1. Regulatory Categories and Key Dimensions of Ecolabels.
Adapted from Kesidou and Palm (2024).

3. Methodology: An iterative, qualitative assessment approach

We used an exploratory, qualitative research approach that included identifying, mapping and analysis of regulations in relation to the ecolabels used in the UK TFI, see Figure 2. We start by categorising the identified regulations into four regulatory categories consistent with our conceptual framework see Figure 1. We map identified regulations across the different geographic jurisdictions described in section 3.2.
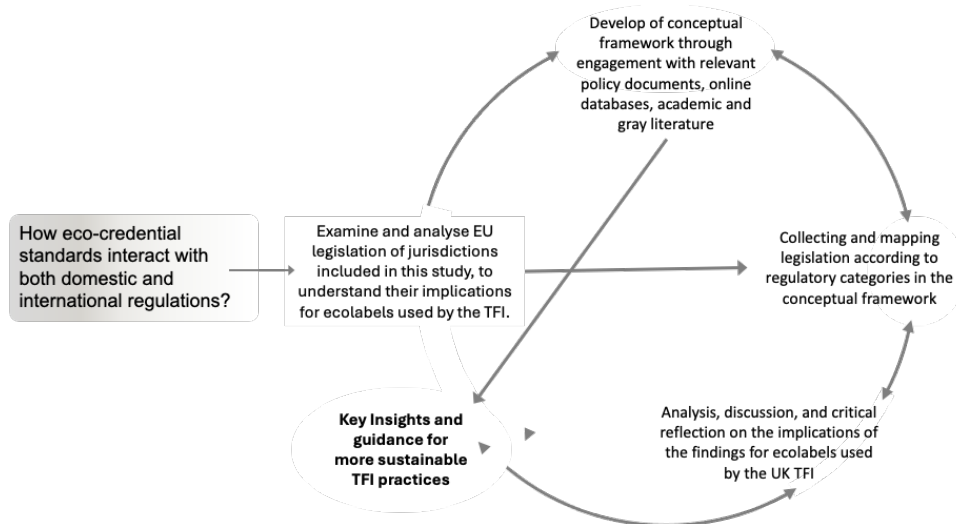
Figure 2. Methodology for understanding how legislation interacts with ecolabels in the TFI.

We map the regulations according to the categories seen in Figure 1. Finally, we also code for regulations that retailers must legally comply with. This is because while some regulations, such as restrictions on textile waste exports, directly impact retailers' operations (e.g., how they handle waste disposal), retailers are not required to legally comply with all regulations that affect them.

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Table 3. Structure for mapping the regulatory categories.

Category	Scope of regulations
Climate, Emissions & Energy	Regulations governing climate change mitigation, carbon emissions reduction, and energy consumption efficiency within the textile value chain.
Circular End-of-life Management	Regulations addressing textile waste management across all tiers of the value chain, including recycling, reuse, and disposal.
Consumer Goods, Certification & Labelling	Regulations targeting finished textile products, specifically those influencing consumer purchasing decisions through sustainability claims, ecolabelling, and product transparency.
Reporting	Regulations mandating disclosure of value chain activities, sustainability performance, and environmental impact assessments.

3.1. Data collection

Our primary data sources used for identifying relevant regulations are:

◊ **EU Strategy for Sustainable and Circular Textiles** (European Commission, 2022): This strategy outlines the EU's comprehensive approach to promoting sustainability and circularity in the textile sector.

◊ **A report on Textile Sustainable Regulations** (Carbonfact, 2025): This report provides information into the regulatory measures adopted globally to enhance the sustainability of the TFI. Additionally, it highlights which regulations the TFI considered most critical.

◊ **Ecolex Database** (Ecolex, n.d.): Ecolex is an extensive database that provides information on environmental law, treaties, international soft-law, non-binding policy and technical guidance documents, national legislation, judicial decisions, as well as on law and policy literature. It is operated by the Food and Agriculture Organization of the United Nations (FAO), the International Union for Conservation of Nature (IUCN), and the United Nations Environment Programme (UNEP).

In addition, our data collection method involves various documents, reports and websites covering topics such as: textiles and the environment in a circular economy (ETC/WMGE, 2019); EU policy (European Commission, 2025; Eurostat, 2024; "The European Green Deal - European Commission," 2021); the ending of the Multi-Fiber Agreement (Brambilla et al., 2007; World Bank, 2006); the EU Ecolabel (Dodd et al., 2013; European Commission, 2014); Digital product passport in the textile sector (European Parliament. Directorate General for Parliamentary Research Services., 2024); preparatory study on textiles for product policy instruments (JRC Science for Policy Report, 2023); consultancy and NGO reports on circularity and industry outlook (McKinsey & Company, 2025; Syrett et al., 2024). By integrating these sources and categorising legislation accordingly, our methodology helps us conduct an analysis of the regulatory landscape affecting the TFI, particularly in relation to climate change and circular end-of-life management.

The data on eco-credentials and ecolabels is sourced from Kesidou & Palm (2024), which assesses the strengths and weaknesses of various ecolabels and provides recommendations to enhance their effectiveness within the UK's TFI. This data is crucial to help us identify synergies and trade-offs between eco-credential standards and international regulations, as well as understanding the challenges and benefits of implementing these standards within the UK's TFI and the influence of international regulatory frameworks on their effectiveness.

3.1 Regulatory categories

We code for climate change and textile waste because these issues are of significant concern to both policymakers and stakeholders in the TFI. Our coding focuses on the direct impact on actors in a value chain tier, or whether the issue is explicitly addressed in the legislation. Following our description in Table 3this means that for example:

- **Climate, Emissions & Energy**: The European Climate Law is coded under the environmental attribute *'Climate, Emissions & Energy'* because it mandates a 55% reduction in greenhouse gas emissions by 2030 compared to 1990 levels, requiring firms to align their operations with these climate targets.
- **Circular End-of-life Management:** The Ecodesign for Sustainable Products Regulation (ESPR) is coded under *'Circular End-of-life management'* as its main goal is to reduce waste by extending product lifespans, even though it may indirectly contribute to carbon emission reductions.
- **Consumer Goods, Certification & Labelling:** The Consumer Rights Directive is coded under *'Consumer Goods, Certification & Labelling'* as it focuses on providing consumers with clear, accurate product information, ensuring informed choices.
- **Reporting**: The Corporate Sustainability Due Diligence Directive (CSDDD) is coded under *'Reporting'* because it requires companies to disclose their sustainability practices and risks, emphasising transparency and accountability.

3.1.1.   Climate change

Mitigating carbon emissions has the highest priority amongst environmental policy across geographical and jurisdictional scales (Bailey, 2021; "The European Green Deal - European Commission," 2021; UK Parliament et al., 2025). The IPCC (O'Neill et al., 2022) asserts, with very high confidence, that climate-related impacts have been observed across a wide range of natural, human, and managed systems. Climate change alters conditions for all life on Earth. Current greenhouse gas levels are unprecedented, and as they rise, climate impacts and risks increase. Cutting carbon emissions is the only way to stabilise climate. All countries included in this study, including the EU, have signed the Paris agreement which is a legally binding international treaty on climate change ("The Paris Agreement | UNFCCC," 2024).

3.1.2.   Textile waste

Textile waste is a focal area in European policy due to its significant environmental impact and the current inefficiencies in textile waste management (Deckers et al., 2024). There is no code for 'textile waste' export (EEA, 2023, p. 4). Notably, there is also no joint definition among EU member states of 'textile waste' (Huygens et al., 2023). Tang (2023, p. 454) defines 'textile waste' as "*any undesirable or discarded piece of fabric or clothing that is unfit for its original purpose*".

To expand on this, we define textile waste as any undesirable or discarded material, including fabric, clothing, or by-products from yarn production, that is unfit for its original purpose.

Our definition means that material waste from 'Raw material' – like fibres left in the field – is not included in this study. Since textile waste occurs throughout the value chain, circular end-of-life waste management is relevant across all tiers for pre-, and post-consumer waste. Figure 3 shows a selection of different types of textile waste across various tiers of the value chain. It also illustrates how pre- and post-consumer waste can potentially be prolonged in use and reintegrated into the value chain, instead of ending up in landfills or incineration.
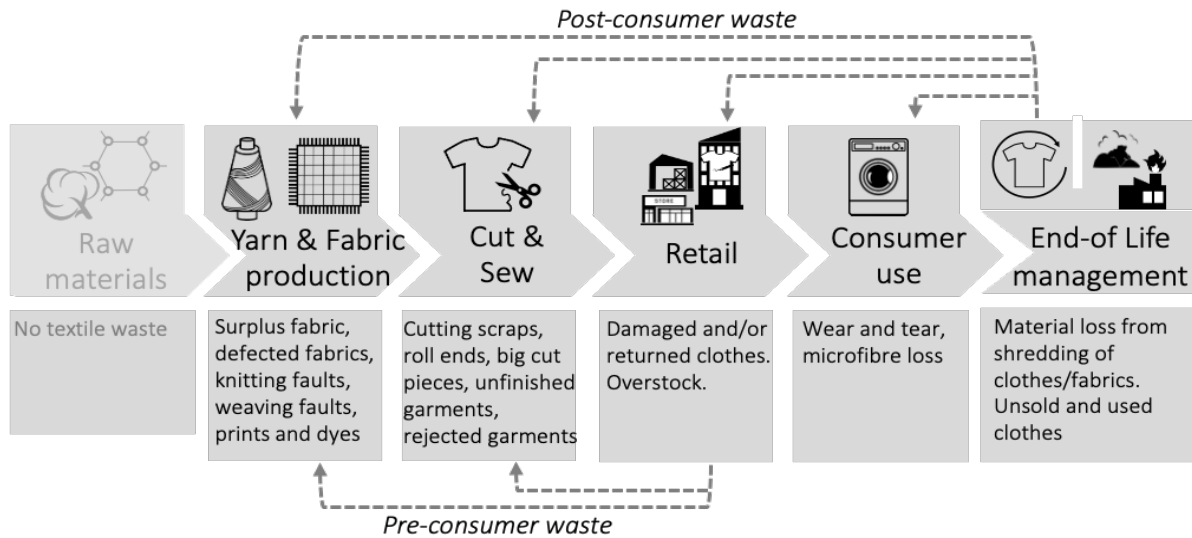
Figure 3. Textile waste throughout the value chain.

While textile waste generated during consumer use is minimal, this tier is included because it has an imperative role since consumers are ultimately the ones make the final decision on how to dispose of their used clothes. Their choices significantly influence the lifecycle of textiles, whether through recycling, donation, or disposal in landfills.

3.2. Geographic jurisdictions

3.2.1. *International to national jurisdictions*

The TFI spans multiple geographical scales, with global reach although each value chain tier operates at a local level. Consequently, TFI firms are influenced by international, regional, and national regulations, as illustrated in
Figure **4**. In this study the only non-state jurisdiction we consider is the European Union (EU). We include relevant EU *regulations* and *directives* as these legislations are legally binding and apply directly to all member states, see Figure B in Box 2. We map regulations in jurisdictions (EU or national) and according to geographical regions: Europe, Asia, North America and Africa. Additionally, we include all regulations and directives mentioned in the EU strategy for sustainable and circular textiles as these are relevant to the global TFI, irrespective of nationality.

Figure 4. International, regional, and national jurisdictions across scales.

To clarify, the Corporate Sustainability Reporting Directive (CSRD) is a legislative requirement, while the European Sustainability Reporting Standards (ESRS), including ESRS E1 (Climate Change), are *frameworks* developed under a *directive,* but they are not laws themselves. In this report we focus solely on *regulations* and *directives* and do not directly address any standards or initiatives included under CSRD or any other regulations.

This means that while the Digital Product Passport (DPP) is likely to have a significant impact on TFI firms, it is not included in this study. Currently, DPP is an initiative still under negotiation. The DPP is currently proposed to be integrated it into the Ecodesign for Sustainable Products Regulation (ESPR) (2024/1781), at which point it will become legally binding for all EU member states.

Box 2. EU legal instruments

Understanding the distinction between binding and non-binding measures, such as Regulations, Directives, and Decisions, is important for navigating EU policies and understanding their implications for member states and the TFI. This clarity is particularly important for stakeholders in the TFI as various EU laws directly impact the industry's operations, sustainability efforts, and compliance requirements. Figure B provides a clear visual representation of the different types of EU legal instruments and their respective levels of binding authority. Figure B also highlights, in green, the legislation types included in this study.

EU Legislation
An umbrella term generally encompasses all types of EU laws, including both binding and non-binding acts.

Impact on firm operations

Included in this study

BINDING		
EU Regulation	– Directly applicable and legally binding on all member states.	
EU Directive	– Legally binding, sets a minimum standard for EU member states. Each member state must comply and enact their own laws within a two-year period. Member states can choose to go beyond the minimum requirements set out in the directive.	
EU Decision	– Binding but applies to specific individuals or entities, not all member states.	

Directly impact firm operations by imposing clear, mandatory requirements that firms must comply with to avoid legal consequences.

NON-BINDING		
EU Strategy	– Non-binding framework that sets out policy goals or directions.	
EU Recommendation	– Non-binding, offers advice or guidance.	
EU Opinion	– Non-binding and generally provides advice or feedback.	
EU Initiative	– Non-binding or preparatory, used to establish priorities to guide voluntary action. Often a precursor to binding laws.	

Indirectly impacts firm operations by laying the foundation for future laws, guiding business practices and encouraging voluntary adaptation to emerging trends and competitive pressures.

Figure B. EU legal instruments and their binding nature.

3.2.2. *Value chain considerations*

To understand how regional and national regulations apply across the TFI's lifecycle, we use a simplified but useful overview of the industry's diverse value chain tiers, Figure 5. We use the description of value chain used by EU (European Commission, 2024, p. 27) that it means '[…] *all activities and processes that are part of the life cycle of a product, as well as its possible remanufacturing*'. The tiers such as yarn and fabric production illustrate different levels at which sustainability measures are applied across various stages of the value chain.

This mapping is useful for understanding how regulations affect different stages of the value chain. By illustrating the various tiers, we can identify which stages of production and consumption are covered by specific regulations. This clarity helps us to assess how regulations influence the industry's environmental practices and the progress toward sustainability goals. Ultimately, this mapping provides us with a clearer framework for understanding the regulatory landscape and its impact across different jurisdictions.

Figure 5. Tiers of the value chain included in this study. (adapted from Kesidou & Palm, 2024). Note: This study excludes the 'Raw Material' tier, as waste from resource extraction is not classified as textile waste according to our definition.

The tiers included in this study are Yarn & Fabric Production, Cut & Sew, Retail, Consumer Use, and Circular End-of-Life Management. While raw material extraction does contribute to climate change, it is excluded from this study because, waste generated from resource extraction does not meet our definition of textile waste (see Section 3.1.2). Moreover, its impacts and dynamics differ significantly from those related to textile production, consumption, and waste management. This study specifically focuses on legislation that directly impacts the TFI, making raw material extraction less relevant to the scope of analysis.

We distinguish between direct impacts and indirect impacts to understand the legal influences across the value chain. This helps us more accurately assess how legislation affects various actors, identify compliance risks, and understand potential operational, financial, or reputational implications.

◊ **Direct impact** refers to legislation that directly affects the operations of actors within a specific tier due to value chain effects.
◊ **Indirect impact** refers to legislation that indirectly affects actors in a specific tier of the value chain due to value chain interdependencies, for example through increased production costs, reputational risks, or value chain disruptions.

3.2.3. *Selection of jurisdiction and countries*

We examine the legal frameworks of leading nations in international textile import and export of new clothes (see Table 4). To capture the full value chain from cradle to grave, we also include key countries that import old clothes from the UK. Our selection is informed by data from the World Integrated Trade Solution (WITS - Data on Export, Import, Tariff, NTM," n.d.), a database developed under the leadership of the World Bank.

Table 4 provides an overview of the top countries involved in the TFI, categorising them by their role in importing and exporting textile goods. Using 2023 data from UN Comtrade ("UN Comtrade," n.d.), it covers:

◊ HS Code 61 - Articles of apparel and clothing accessories, knitted or crocheted
◊ HS Code 62 - Articles of apparel and clothing accessories, not knitted or crocheted
◊ HS code 6309 - Worn clothing and other worn articles

Note the most recent trade date for Bangladesh is from 2015.

Table 4. Leading Countries in Global Textile Fashion Import and Export 2023.

Share of reported **Export** of new clothes (HS codes 61+62) from all countries		Share of reported **Import** of new clothes (HS codes 61+62) from all countries		**Import of worn/used** clothes (HS code 6309) exported **from UK** to all countries	
China	38,4%	EU	43,8%	EU	31,7%
EU	35,6%	USA	19,7%	Ghana	15,4%
Bangladesh	6,7%	Japan	5,7%	United Arab E.	12,8%
Turkey	4,6%	UK	4,9%	Ukraine	11,2%
India	3,7%	China	2,3%	Pakistan	3,0%
Indonesia	2,0%	Pakistan	< 0,1%	Turkey	1,0%
Pakistan	1,9%	Turkey	0,7%	USA	0,8%
United Arab E.	1,6%	India	0,4%	Japan	0,6%
USA	1,6%	Bangladesh	0,2%	India	0,3%
UK	1,0%	Indonesia	0,1%	Indonesia	< 0,1%
Japan	0,2%	Ukraine	< 0,1%	China	0,0%
Ukraine	0,2%	United Arab E.	< 0,1%	Bangladesh	n. a
Ghana	< 0,1%	Ghana	< 0,1%	UK	–

(Source: UN Comtrade n.d). Included in this study are countries highlighted in grey. Note: the most recent trade date for Bangladesh is from 2015.

In total we include nine jurisdictions with global distribution, see Figure 6, the EU (including member states with additional national legislations), the UK, China, Bangladesh, India, USA, Turkey, Ghana, and United Arab Emirates based on below motivations:

United Kingdom (UK):
As a major importer of new clothing and key exporter of used textiles, the UK plays a significant role in the global TFI. With upcoming policy shifts the UK is taking steps to align its sustainability goals with waste reduction strategies. This proactive stance, combined with its leadership in environmental policies and commitment to net-zero carbon emissions by 2050, makes it an important case for understanding how national policies influence global textile flows and environmental impacts. Investigating the UK's regulatory framework and waste export patterns offers valuable insight into the broader effects of sustainability initiatives within the textile sector.

European Union (EU):
With regulatory frameworks among the most robust in creating binding legal requirements for member states the EU is at the forefront of sustainability regulations in the textile sector. Policies such as the Circular Economy Action Plan (CEAP) and the EU Strategy for Sustainable and Circular Textiles emphasise waste prevention, eco-design, and stricter producer accountability, influencing global TFI value chains. Examining the EU's approach provides a benchmark for regulatory effectiveness in reducing textile waste and mitigating climate change impacts.

Bangladesh:
A global leader in garment production, Bangladesh is a cornerstone of the fast fashion industry and a major exporter of new clothes, despite limited domestic consumption. The country's exclusion from the export of used clothing highlights waste management dynamics and provides an opportunity to investigate its policies and practices related to textile waste and environmental sustainability. Bangladesh's role in addressing climate change and waste, is central to understanding TFI's value chain management concerning the environmental impact of clothing production.

China:
As the world's largest textile producer and exporter, China has a significant impact on global textile value chains and waste generation. While historically focused on production, China is increasingly emphasising circular economy practices, textile recycling, and sustainable fashion initiatives. Its evolving regulatory landscape, including restrictions on textile waste imports and domestic recycling policies, is important to include for understanding how major manufacturing economies address textile waste and climate challenges.

Ghana:
Ghana represents a significant importer of used clothing (15.4% from the UK). Its large second-hand markets are essential for understanding the global trade of worn clothes and the implications of such trade for waste management, climate change, and sustainable practices in developing economies.

India:
India plays a dual role as a producer and consumer of textiles, albeit with moderate shares in imports (0.4%), and important role in exports (6.7%) of new clothes. It is also emerging as a hub for second-hand clothing markets and textile recycling industries. India's growing efforts to address textile waste, promote circular economy practices, and mitigate climate change effects through waste management strategies offer insights into sustainable practices and regulatory approaches in emerging markets.

Turkey:
A major textile producer and regional exporter (4.6% of exports), Turkey occupies a strategic position in the TFI value chain, serving as a bridge between Europe and Asia. Despite not being an EU member, Turkey's regulatory measures concerning textile recycling, waste reduction, and sustainability are important for understanding how countries outside the EU align with or adapt to EU laws and standards. Turkey's approach to these issues offers insights into the intersection of textile production, waste management, and climate change in the region, particularly in the context of European regulations.
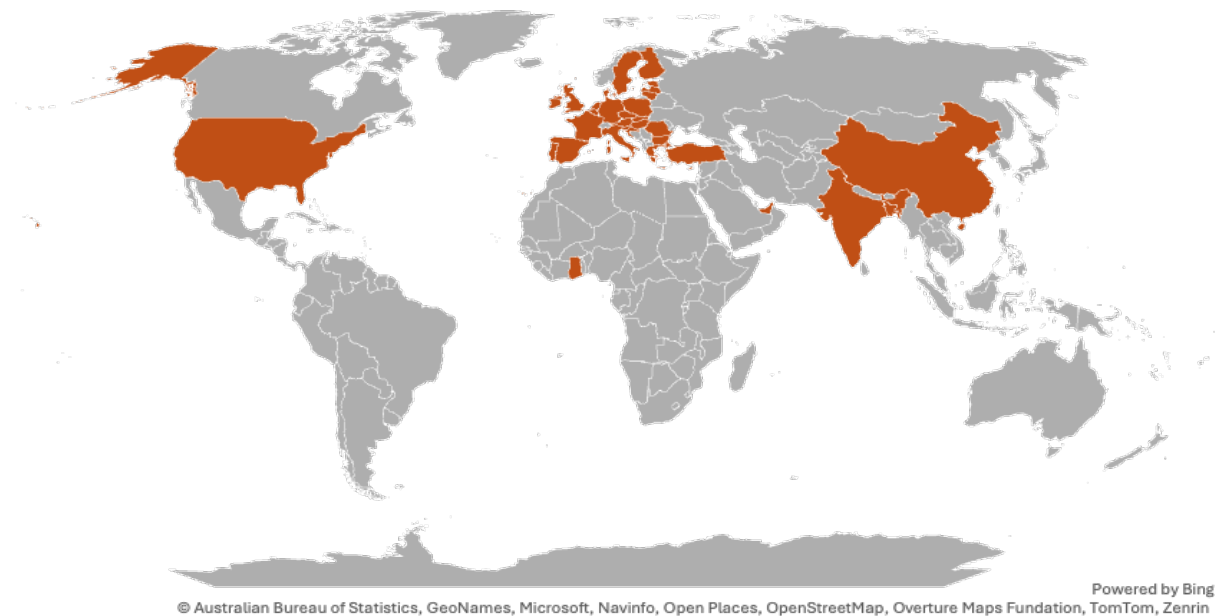
United Arab Emirates (UAE):
The UAE has become a growing re-export hub for new clothes (12.8%), benefiting from its strategic location between Europe, Asia, and Africa. Its emerging role in the second-hand clothing trade highlights its involvement in global redistribution networks, making it an important case when studying regulatory frameworks related to textile waste management and climate change adaptation.

United States (USA):
As a major importer of new clothes (19.7%) and a significant exporter of used clothing, the USA exemplifies consumption-heavy economies. Its regulatory approach to waste management, recycling, and sustainability in textiles is critical to understanding the global waste streams associated with the textile industry. The USA's role in shaping global value chains and contributing to textile waste underlines the need for effective climate change policies in managing textile waste and reducing environmental footprints.

Japan and **Ukraine** are not included in this study. While Ukraine has historically held a significant position as a recipient of used clothing from the UK (11.2%), the ongoing war has disrupted its economic and regulatory systems, complicating a consistent analysis of regulations concerning textile waste and recycling. While Japan is a notable player in the textile industry, its relatively small share in both imports (5.7%) and exports (0.6%) of new clothes, combined with its limited participation in the trade of used clothing, makes it less relevant to the focus of this study. Japan's textile trade is also more regionally concentrated and less interwoven with the countries under review, reducing its relevance to global textile waste management and climate change regulations.

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Figure 6. Countries covered by climate change and circular end-of-life management legislations in this study.
This map shows that jurisdictions and legislations included in this study captures the global distribution of the top importers and exporters of textile fashion, as well as the leading importers of used clothing from the UK.

4. Findings, analysis and discussion of how international regulatory frameworks influence ecolabel effectiveness

In total we include 66 legislations, see Table 5, that meet the criteria set up in our methodology. In this section, we start by presenting the evolution of legislations. We look at legislations and ecolabels over time in relation to key global environmental policy agreements to understand how regulatory and market-driven approaches have evolved to address sustainability challenges. Following that – in accordance with the regulatory categories in our conceptual framework – we present, analyse and discuss our findings and how legislation influences the effectiveness of ecolabels. Lastly, we present and discuss regulatory categories that Retail, e.g. UK textile fashion firms, must comply to when operating on an international market.

Table 5. Overview of the distribution of regulatory frameworks by jurisdiction in the TFI.

Jurisdiction		Regulatory categories			
		Circular end-of-life management	Climate, Emissions & Energy	Reporting	Consumer Goods certification & labelling
UK		2	1	--	2
EU		5	12	3	7
EU member states with additional national legislations	Austria	--	--	1	--
	Finland	1	--	--	--
	France	1	--	2	1
	Germany	--	--	1	--
	Greece	1	--	--	--
	Latvia	1	--	--	--
	Netherlands	1	--	1	--
	Spain	1	--	--	--
	Sweden	2	--	--	1
Bangladesh		--	2	1	--
China		2	--	--	--
Ghana		4	--	--	--
India		1	1	--	--
Turkey		2	--	--	--
United Arab Emirates		1	--	--	--
USA*		1	2	2	--
Total		26	18	11	11

*The legislations listed in this table include those applicable at both the federal level in the United States and within individual state jurisdictions.

4.1. Evolution of regulation categories

Policy is not static, legislation changes over time, adapting to new sustainability challenges and market demands (Puglia et al., 2024). Likewise, ecolabels do not operate in isolation; they are embedded within a larger business ecosystem that includes businesses, policymakers, and consumers (Palm, 2023). As part of this interconnected system, ecolabels and regulations both reflect and respond to ongoing societal and environmental discourses, evolving in response to dynamic interactions between policymakers and key stakeholders.

Mapping the development of both ecolabels and legislation on a timeline (Figure 8 and 9) provides valuable context for understanding how these elements co-evolve. This approach highlights how shifts in regulatory frameworks, market pressures, and consumer expectations influence ecolabel criteria, shaping their long-term impact and overall effectiveness in promoting sustainability and ensuring regulatory compliance.

Figures 8 shows the development of legislation since the 1970s when environmental regulation primarily focused on broad environmental protection measures rather than specific waste management strategies for textiles. These regulations provided foundational legal frameworks for environmental standards but did not target textile industry waste. Up until the 1990s environmental regulations emphasised end-of-pipe solutions, such as pollution fines and emission limits, rather than proactive waste reduction strategies.
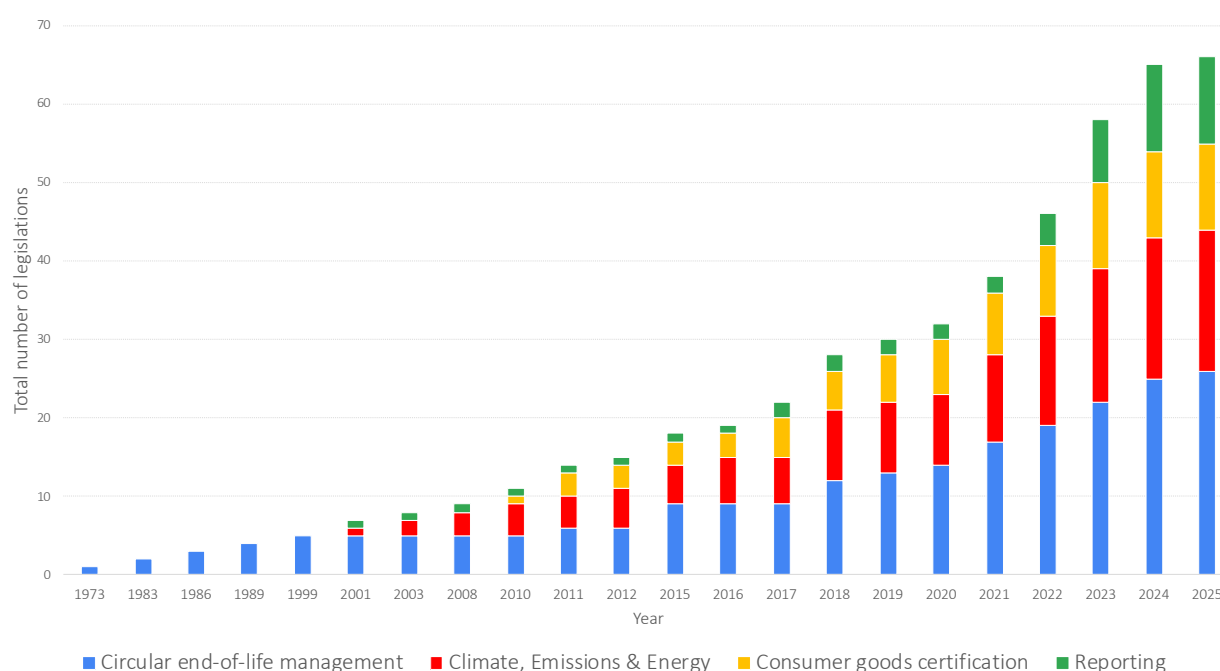
Figure 7. Growth of included legislations over time categorised by regulatory category.
The timeline illustrates growth trends across the regulatory categories - Climate, Emission & Energy, Circular end-of-life management, Consumer goods certification and Reporting - highlighting their focus on specific aspects of value chain activities and environmental impacts.

Overall, the development of environmental regulations shows a shift from general environmental protection toward more industry-specific regulations that address textile waste at multiple levels – waste prevention, material recovery, and producer accountability. This trend is particularly evident in the current increase of policy focus of integrating sustainability goals, EPR frameworks, and stricter compliance measures to tackle the environmental impact of textile production and disposal.

Figure 9 shows that the increase in ecolabels began in the 1990s a decade when the Multi-Fibre Agreement (MFA), which set quotas limiting textile imports into wealthier North countries was replaced by the Agreement on textiles and Clothing (ACT) (Brambilla et al., 2007; World Bank, 2006). ACT – a temporary agreement to remove the quotas and bring the international textile trade back into GATT rules – ended 2005. The ending allowed exports

from low-cost producers like China to surge leading to the global exponential increase of fast fashion. This was the same decade when consumers had to make more individual choices on what and how to dress, and became more aware of the consequences of their purchasing behaviours (Beck and Beck, 2009; Boström and Klintman, 2008).

While no single event can be traced as a cause to ecolabels launches, it is relevant to also mention that 18 of the 25 ecolabels that include climate change in their standard have been launched after the year 2000, following with the international agreement on the Millenium Development Goals (Kesidou and Palm, 2024). During this period, there was also a significant increase in ecolabels claiming to have a 'cradle-to-grave' scope, meaning they include all value chain tiers from recourse extraction to end-of-life indicating a circular management approach. This precedes regulations indicating that firms can and do act faster than policymaking – firm's decision-making appears to be both proactive, responding to consumer attitudes, and reactive, anticipating upcoming legislation.
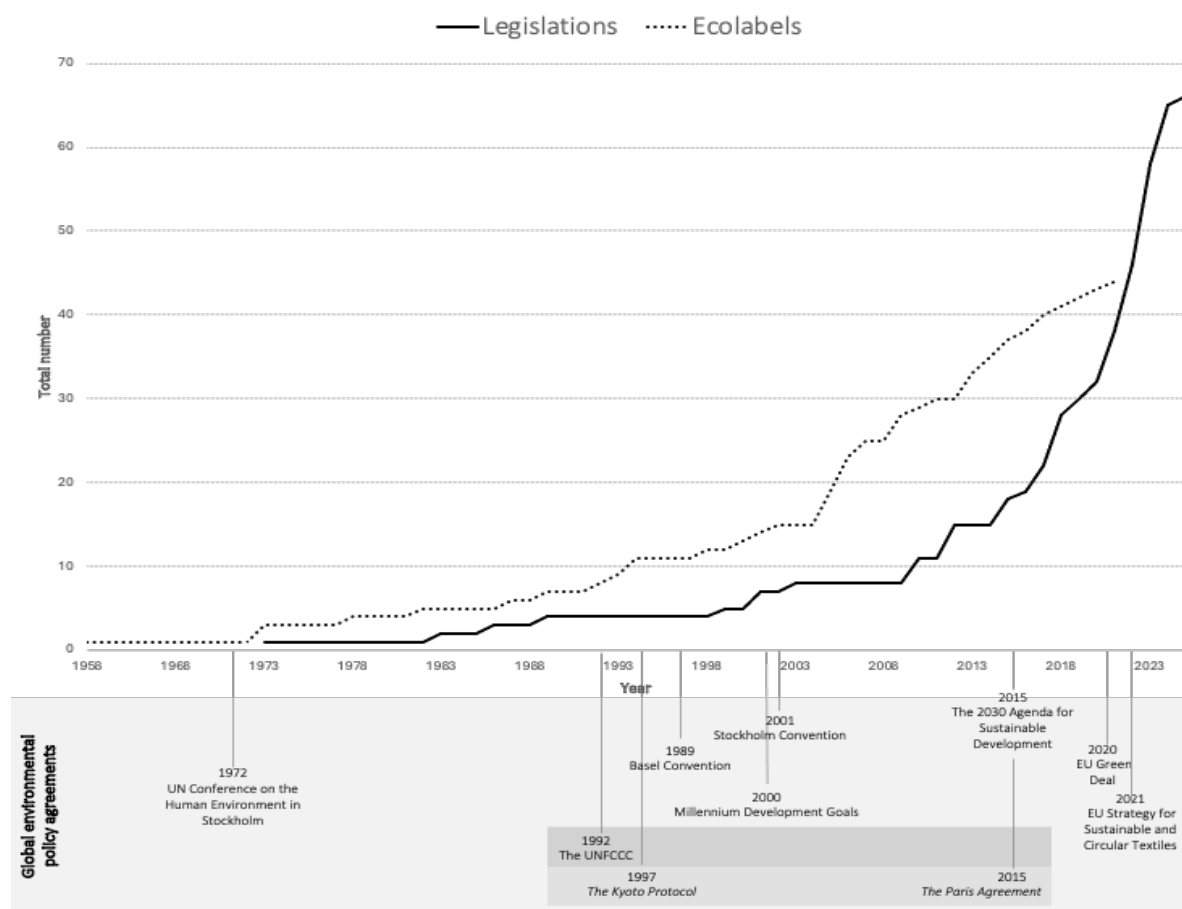
Figure 8. Growth of included legislations and ecolabels (Kesidou & Palm 2024) over time in relation to key global environmental policy agreements (REFS to all agreements).
The figure illustrates the cumulative number of legislations and ecolabels from 1960 to 2023, highlighting key global environmental policy agreements that have influenced sustainability governance. Major milestones such as the 1972 UN Conference on the Human Environment, the 2015 Paris Agreement, and the 2020 EU Green Deal are marked to show their correlation with regulatory and ecolabel developments.

Table 5 as well as Figure 9 show that Circular end-of-life management regulations are increasing in all regions, and currently dominate most value chain stages, particularly in Yarn & fabric production, Cut & sew, and Retail. This indicates a strong policy focus on waste reduction, recycling mandates, and extended producer responsibility (EPR) policies.
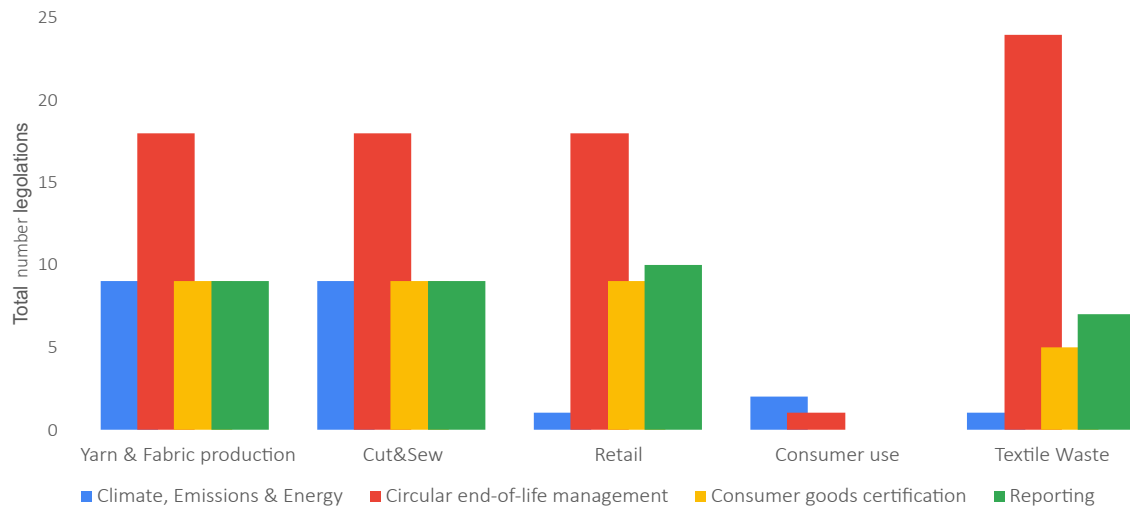
Figure 9. Distribution of legislations with DIRECT impact across TFI value chain tiers.
Illustrates the distribution of regulations across different stages of the TFI value chain, categorised into the four regulatory categories, Climate, emissions & energy (blue), Circular end-of-life management (red), consumer goods certification (yellow), and Reporting (green).

The high presence of circular regulations in the value chain tier textile waste (Figure 9) further reinforces the increasing legislative emphasis on managing post-consumer textile disposal. Yarn & fabric production, Cut & sew, and Retail exhibit a relatively balanced distribution of regulations, with Reporting and Consumer goods certification maintaining a noteworthy presence. This points to compliance and transparency requirements throughout the value chain.

In contrast, consumer use has the fewest regulations overall, with only a minimal presence of Climate, emissions & energy and Reporting regulations, highlighting a regulatory gap in addressing consumer behaviours such as product maintenance and longevity.

Textile waste emerges as a legislative hotspot with the highest total number of regulations, particularly in Circular end-of-life management. The presence of Reporting and Consumer goods certification at this tier suggests an increasing push for corporate accountability and transparency in waste handling and disposal.

Overall, our findings suggests that circularity is becoming the most legislated aspect of the textile industry, aligning with global sustainability agendas such as the EU Strategy for Sustainable and Circular Textiles (2021), while climate and emissions regulations, though consistently present, are not dominant.

The high regulatory presence in Consumer goods certification is contrasting the weak regulatory presence in consumer use. This weak regulatory presence in consumer use presents an opportunity to enhance the effectiveness of ecolabels by introducing policies that better inform and guide consumer choices. Ecolabels serve as important tools for communicating the environmental impact of products, yet their effectiveness depends on consumer awareness, trust, and the integration of regulatory support (Kesidou and Palm, 2024). By addressing this regulatory gap, policymakers could support ecolabel credibility, reduce greenwashing, and contribute to meaningful shifts in consumption patterns, ultimately strengthening ecolabels' role as market drivers for sustainability.
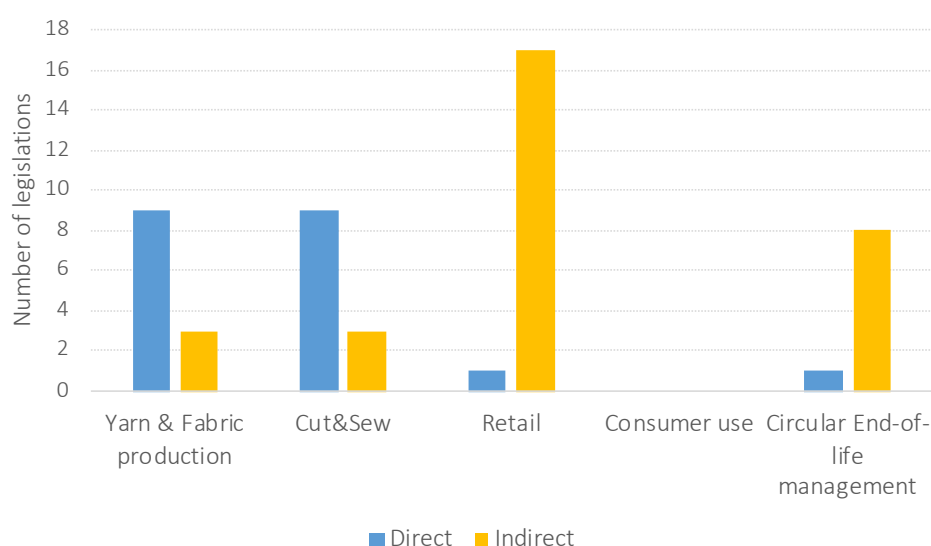
4.2. Climate, Emissions and Energy regulations across the value chain

There is a difference in regulatory impact across different tiers of the TFI value chain, Figure 10. Climate, Emissions & Energy legislations primarily have direct regulatory influence on Yarn & Fabric Production and Cut & Sew tiers, with nine direct regulations affecting each. This reflects a strong policy focus on emissions-intensive upstream processes, such as textile manufacturing and processing, where energy consumption and greenhouse gas emissions are highest.

In contrast, Retail and Consumer Use tiers show minimal direct regulation, with only a single direct legislation affecting Retail and none at the Consumer level. This suggests a regulatory gap in addressing downstream emissions, particularly those related to linking Retail with consumer behaviour, product lifespan, and disposal impacts.

Indirect regulatory impact is strongest at the Retail stage (17 legislations), see Table 6, indicating that firms in this tier must adapt with broader climate and energy policies that, while not targeted specifically at the sector, still shape operational practices. This includes corporate sustainability reporting requirements, energy efficiency standards, or broader environmental taxation schemes. The relatively high number of indirect regulations in the Circular End-of-Life Management category (8 legislations) suggests that some climate policies aim to influence waste management and recycling, though they may not be designed specifically for the textile sector.

The disproportionate focus on upstream activities may limit the effectiveness of ecolabels in promoting cradle-to-grave perspective. While production-related ecolabels are supported by existing policies, ecolabels relating to retail, consumer use, and circularity have weaker regulatory backing. Additionally, the strong indirect regulatory impact on retail suggests an opportunity for harmonising ecolabel criteria with existing corporate climate regulations.

Figure 10. Regulatory impact of Climate, Emissions & Energy legislations across the TFI value chain.
Direct (blue) and indirect (yellow) impacts across different value chain tiers.

Table 6. Legislations in the regulatory category Climate, Emissions & Energy

| Jurisdiction	Legislation	Year	Short Description	Brief context of the impact on TFI
UK	**Climate Change Act 2008**	2008	Establishes legally binding carbon reduction targets for industries, including textiles.	Forces textile firms to comply with carbon reduction commitments by adopting cleaner production methods and improving energy efficiency.
EU	**Effort sharing regulation**	2018	Sets national emission reduction targets, indirectly influencing emissions in textile production processes.	Influences TFI by shaping national climate policies aimed at reducing greenhouse gas emissions. While not sector-specific, it increases pressure on firms to adopt low-carbon production methods and sustainable materials.
EU	**Emissions trading system directive**	2023	Imposes limits and pricing mechanisms on emissions in textile mills and raw material extraction processes.	Imposes carbon pricing on textile mills and raw material extraction processes, affecting operational costs. Firms must either reduce emissions or purchase carbon credits, driving investments in cleaner technologies.
EU	**Energy Performance of Buildings Directive**	2018	Establishes energy efficiency standards for production and retail buildings, and warehouses.	Impacts TFI firms by mandating energy efficiency improvements in production facilities, warehouses, and retail spaces within the EU.
EU	**Energy taxation Directive**	2021	Promotes energy taxation to reduce carbon footprints across production and distribution stages.	Incentivises energy efficiency in TFI operations by increasing costs for fossil fuel-based energy, encouraging a shift toward renewable energy sources.
EU	**European climate law**	2021	Establishes binding climate targets, impacting emissions reductions across all textile production and distribution stages.	Requires TFI firms to align operations with binding emissions reduction targets. Compliance will necessitate investments in energy efficiency, renewable energy, and circular economy initiatives.
EU	**Industrial emissions directive**	2022	Imposes limits on industrial emissions, affecting production processes in mills and factories.	Regulates emissions from textile manufacturing processes, such as dyeing and finishing. TFI firms must adopt best available technologies (BAT) to minimise environmental impact.
EU	**National emissions directive**	2016	Sets national-level emission reduction targets for industrial operations, including textile production.	Regulates emissions from TFI production facilities, particularly in dyeing and finishing processes. Firms must comply with national limits to avoid financial and reputational penalties.
EU	**Regulation on fluorinated greenhouse gases**	2024	Limits emissions of fluorinated gases used in manufacturing and retail operations.	Impacts TFI firms using fluorinated gases in manufacturing processes, requiring them to adopt alternative technologies to reduce emissions.
EU	**Regulation on gas storage**	2022	Indirectly affects emissions value for textile production processes through gas storage mandates.	Indirectly affects TFI by ensuring stable gas supplies, which can influence textile production costs.

EU	**Regulation on the governance of the energy union and climate action**	2018	Oversees energy governance to meet climate and energy goals across all stages of the value chain.	Encourages TFI firms to adopt energy-efficient processes and report emissions, contributing to national climate strategies.
EU	**Renewable Energy Directive**	2023	Encourages the adoption of renewable energy sources in production, manufacturing, and retail.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	**Trans-European networks for Energy (TEN-E) regulation**	2022	Facilitates energy infrastructure development, indirectly supporting energy needs in European textile production and distribution.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
Bangladesh	**Bangladesh Energy Regulatory Commission (BERC) Act 2003**	2003	Regulates energy efficiency standards for industrial operations, including textile mills.	Regulates energy consumption in textile mills, encouraging energy efficiency and the use of greener energy sources.
Bangladesh	**Climate Change Trust Act 2010**	2010	Provides a framework for addressing climate change impacts, including emissions from textiles.	Textile and fashion industries must comply with this Act to manage waste and emissions responsibly.
India	**Energy Conservation Act**	2001	Provides mandatory requirements for energy efficiency and conservation, with legal penalties for non-compliance.	Large textile factories are required to undergo an Environmental Impact Assessment and must adhere to provisions regulating air emissions and wastewater treatment.
USA* *State jurisdiction	**California's climate corporate data accountability act**	2023	Requires firms to disclose climate-related data and impacts.	Fashion firms must publicly disclose detailed information about their greenhouse gas emissions, including those from their value chain.
USA	**Clean Air Act (CAA) (1970/1990)**	2012	Regulates CO_2 emissions from power plants, vehicles, and industrial facilities.	Textile firms must comply with emissions standards, adopt cleaner technologies, or face penalties.

4.3. Circular end-of-life management regulations across the value chain

There is a strong regulatory focus on Circular End-of-life management across the TFI value chain, particularly in Retail and Waste Management stages, see Figure 11. The high number of direct legislations in Circular End-of-life management, Retail, and the production tiers indicate that policymakers are increasingly paying attention to regulating waste, recyclability, and material recovery. However, the limited regulations at the Consumer Use stage reveals a potential gap in encouraging consumer participation in circularity efforts.

Regulatory gaps in consumer engagement could limit the effectiveness of ecolabels aimed at promoting sustainable textile disposal. The high regulatory impact on Retail and waste management suggests that retailers – lead firms, are directed to take a leading role in textile fashion circularity. While production and retail are heavily regulated, better policy alignment is needed that links material choices, consumer behaviour, and end-of-life processing.
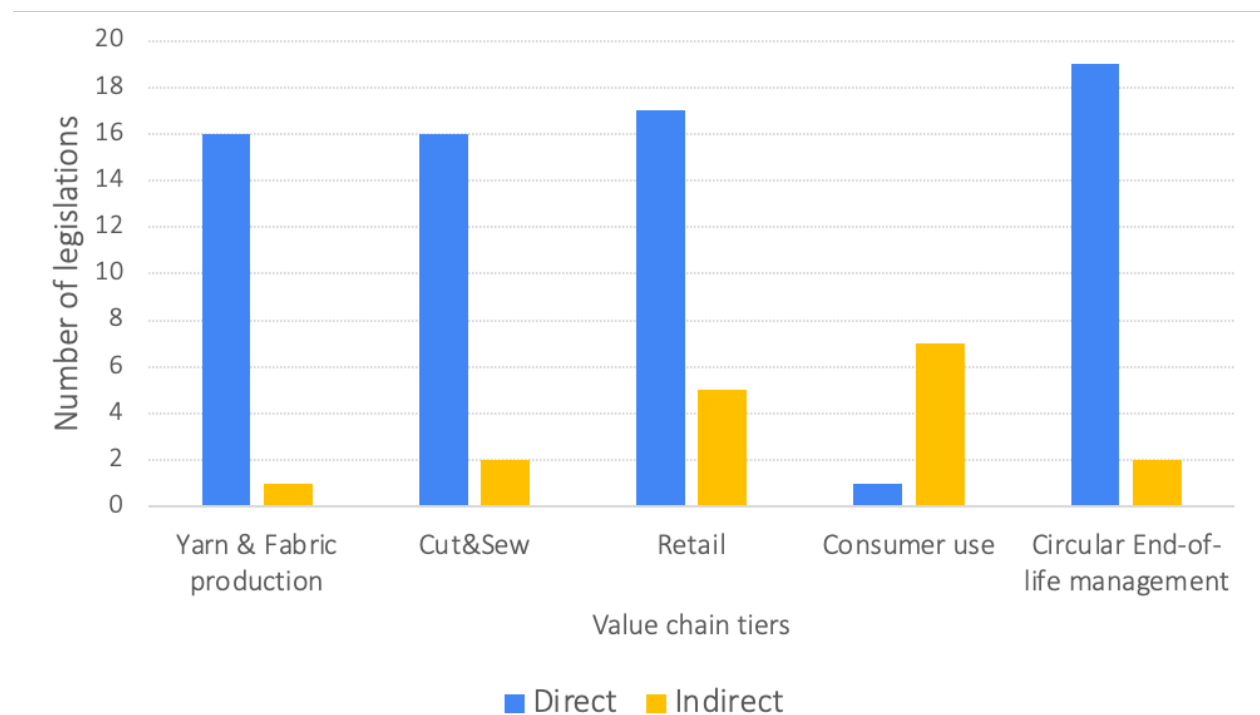
Figure 11. Regulatory impact of Circular End-of-Life Management legislations across the TFI value chain.
Direct (blue) and indirect (yellow) impacts across different value chain tiers.

Table 7. Legislations in the regulatory category Circular end-of-life management

Jurisdiction		Legislation	Year	Short Description	Brief context of the impact on TFI
UK		**The Waste (England and Wales) Regulations 2011**	2011	Sets rules for waste management, emphasising the waste hierarchy, minimising landfill use, prioritising prevention, reuse, recycling, and recovery over disposal.	Obligates textile manufacturers and retailers to comply with waste reduction policies, improving recycling rates and minimising environmental impact.
UK		**Environment Act 2021**	2021	Addresses waste management, air quality, and resource efficiency, including textiles.	Requires textile firms to provide accurate product composition information, preventing misleading sustainability claims.
EU		**Ecodesign for Sustainable Products Regulation (ESPR)**	2024	Encourages eco-design (designed for circularity and resource-efficiency) and mandates sustainability in materials used for garments and textiles.	Requires TFI firms to design products for circularity, resource efficiency, and durability. Requires consideration of recyclability, repairability, and renewable materials, shifting product design priorities toward sustainability.
EU		**Energy efficiency directive**	2023	Sets Energy efficiency standards for production processes, fabric mills, garment factories, and retail spaces within EU member states.	Directly impacts TFI operations within the EU by enforcing energy efficiency standards in textile mills, factories, and retail spaces. Firms must improve energy performance to meet regulatory requirements.
EU		**Landfill directive**	2018	Restricts waste disposal in landfills and encourages recycling and recovery alternatives.	Encourages waste reduction in TFI by restricting landfill disposal and promoting textile recycling. Non-compliance can lead to higher waste management costs.
EU		**Waste framework directive**	2018	Provides a framework for waste management, including textile recycling and landfill diversion.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU		**Waste shipments regulation**	2024	Regulates cross-border waste shipments to ensure sustainable disposal and recycling.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	France	**Anti-waste law for a circular economy (AGEC law)**	2022	Encourages circular economy practices, including extended producer responsibility and waste reduction.	Prohibits textile firms from destroying unsold clothing and mandates sustainable waste management strategies.
EU	Finland	**Decree on Textile Waste**	2021	Enforces measures for managing textile waste, including recycling and disposal.	Establishes textile waste collection and recycling requirements, requiring manufacturers to contribute to waste reduction initiatives.
EU	Greece	**Integrated Framework for Waste Management**	2021	Sets regulations for managing textile waste, focusing on recycling and landfill diversion.	Holds textile producers responsible for managing textile waste, ensuring funding and infrastructure for recycling and circular economy initiatives.

|					
EU	Latvia	**Rules for the extended system of liability of the manufacturer establishment and application of textile products**	2024	Requires manufacturers to take responsibility for the environmental impacts of their products.	Requires textile firms to finance and manage the collection, sorting, and recycling of used textiles, reducing landfill dependency.
EU	Netherlands	**Extended Producer Responsibility for Textiles**	2023	Obligates textile producers to manage end-of-life impacts of clothing and household textiles promoting recycling.	Holds textile producers accountable for the entire lifecycle of their products, requiring them to fund collection, recycling, and responsible disposal systems.
EU	Spain	**Law on Waste for a Circular Economy**	2022	Introduces waste management measures to support circular economy goals.	Establishes strict regulations on textile waste handling, encouraging firms to implement recycling initiatives and sustainable production methods.
EU	Sweden	**Extended Producer Responsibility for Textiles**	2023	Requires textile manufacturers to finance and support recycling programs.	Obligates textile firms to implement sustainable product lifecycle management, covering production, usage, and end-of-life disposal.
EU	Sweden	**Waste regulation (Avfallsförordning)**	2020	Governs waste management, including textile waste recycling and disposal practices.	Requires textile firms to reduce carbon emissions in production and adopt sustainable energy practices to meet national climate targets.
China		**Environmental Protection Law**	1989	Addresses waste management practices, including recycling and sustainable disposal for environmental protections in industries, including textiles.	Requires firms to manage industrial waste, including textiles, fabrics, and packaging, in an environmentally responsible manner. This may involve implementing recycling programs and adopting cleaner technologies.
China		**Ban on import of waste**	2019	Prohibits importing waste, encouraging local recycling solutions.	Textile firms must seek alternative countries for exporting textile waste.
Ghana		**Customs Act**	2015	Oversees import and export regulations, potentially affecting textile products.	Used clothing imports must ensure that old clothes do not pose health or environmental risks.
Ghana		**Standards Authority Act**	1973	Oversees product standards, including textiles, focus on quality assurance, public health, and safety	Regulates the importation and disposal of second-hand textiles to prevent health risks and disease transmission.
Ghana		**Environmental Protection Agency Act**	2015	Ensures that imported goods, particularly textiles, do not contribute negatively to the environment.	Exporters of worn clothing to Ghana need to ensure compliance with Ghana's environmental regulations, including the Environmental Protection Agency Act, and must be mindful of the potential environmental impacts of imported products.
Ghana		**Environmental Sanitation Regulations, LI 1631 (1999)**	1999	Establishes a collaborative approach to managing environmental sanitation challenges, covering areas such as waste management, public hygiene, and environmental monitoring. While it does include industrial waste, it does not specifically mention textile waste, such waste may be considered part of the broader category of "solid waste."	While it does not specifically mention textile waste, textile waste may fall under the broader category of "solid waste."

Country	Law	Year	Description	Impact
India	**Environment (Protection) Act**	1986	Provides overarching environmental protections, waste management relevant to textile production.	Textile firms must comply with rules for pollution control, waste management, water and air quality standards, and environmental audits.
Turkey	**Environment Law No. 2872**	1983	Encompasses environmental protections relevant to textile production and waste management.	Large textile factories are required to undergo an Environmental Impact Assessment and must adhere to provisions regulating air emissions and wastewater treatment.
Turkey	**Waste Management Regulation**	2015	Regulates waste management practices, including recycling and sustainable disposal.	Requires textile manufacturers to minimise waste generation and enhance recycling efforts, while maintaining records of waste management activities and reporting on waste generation and disposal methods. Aligns Turkey with international standards.
United Arab Emirates	**Integrated Waste Management**	2018	Provides a framework for waste management, emphasising reuse, recycling and sustainable disposal practices.	Textile exporters must ensure that old clothes are part of a legitimate recycling process and not simply dumped as waste. Clothes sent for donation or recycling must be handled through certified facilities that comply with UAE's waste diversion and recycling goals.
USA* *State jurisdiction	**Responsible Textile Recovery Act of 2024** (California)	2025	Mandates that retailers ensure their products are managed at the end of their life cycles in a sustainable way,	Requires retailers to implement significant changes in their product life cycle management, particularly in how they manage post-consumer textiles.

4.4. Consumer goods certification & labelling regulations across the value chain

The highest regulatory presence for regulations in the regulatory category Consumer goods certification & labelling results is found in the tiers of Retail and Production (Table 8). Consumer Use and Circular End-of-Life Management are relatively underregulated in terms of direct mandates, see Figure 12.

The relatively low regulatory focus on circularity certifications, see Figure 12, suggests that waste-related ecolabels, such as biodegradability, recyclability, or take-back program certifications, remain underdeveloped compared to production-focused ecolabels.

Strengthening regulations in this area could bridge the gap between production-focused sustainability claims and real-world circularity outcomes, ensuring that certified sustainable products also have clear end-of-life management solutions.
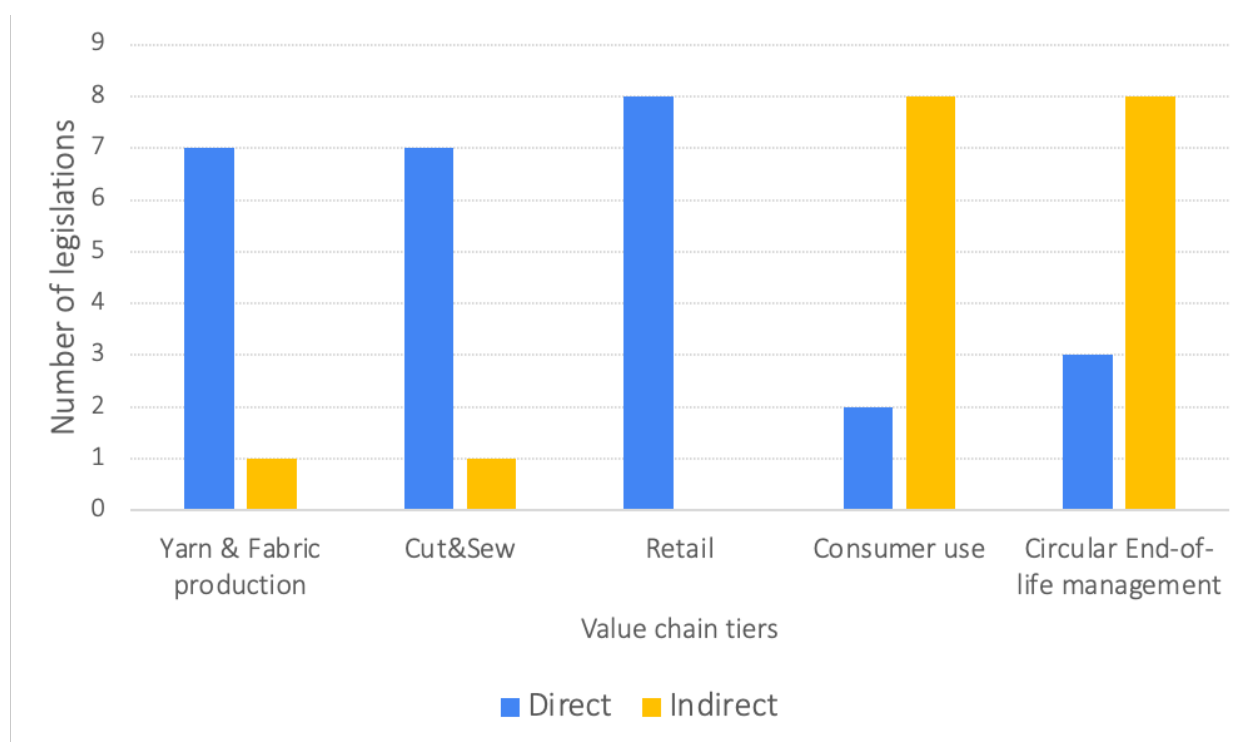
Figure 12. Regulatory impact of Consumer goods legislations across the TFI value chain.
Direct (blue) and indirect (yellow) impacts across different value chain tiers. Direct impacts are most prominent in the Yarn & Fabric Production, Cut & Sew, and Retail tiers. The value chain tiers Consumer Use and Circular End-of-life management sees a higher proportion of indirect impacts.

Table 8. Legislations in the regulatory category Consumer goods certification

Jurisdiction	Legislation	Year	Short Description	Brief context of the impact on TFI
UK	**Textiles Regulation (EU) No 1007/2011**	2011	Regulates labelling of the composition of the fabric in textile products for transparency and consumer awareness.	Standardises textile labelling to ensure consumers receive accurate information about material content and environmental impact.
UK	**Textile labelling regulations**	2020	Provides ecolabelling standards for textile and garment products offered to consumers.	Standardises textile labelling to ensure consumers receive accurate information about material content and environmental impact.
EU	**Consumer rights directive**	2011	Enforces ecolabelling, transparency in product claims, and consumer protections related to TFI products.	Significantly impacts the TFI by enhancing consumer protection, requiring firms to provide clear product information, comply with return policies, and ensure transparency in online sales. Mandates effective dispute resolution mechanisms and restricts misleading marketing practices to ensure honest advertising.
EU	**Ecolabel regulation**	2010	Provides ecolabelling standards for textile and garment products offered to consumers.	Impacts the TFI by setting environmental standards that textile and garment products must meet to obtain the EU Ecolabel. Firms must comply with sustainability criteria across product lifecycles.
EU	**Energy Labelling Framework Regulation**	2017	Provides energy consumption labelling for clothing with energy-related features, for consumer awareness and decision-making in retail.	Requires TFI firms to comply with energy efficiency labelling for textiles incorporating energy-related features, such as heated garments or smart textiles, influencing product design and manufacturing.
EU	**Substantiation and communication of explicit environmental claims** (Green claims directive)	2023	Regulates the accuracy and substantiation of environmental claims in product labelling and marketing.	Mandates that all environmental claims made by TFI firms are substantiated with verifiable data. Firms must provide third-party verified lifecycle assessments or certifications to support sustainability claims, reducing greenwashing risks.
EU	**Right to repair directive**	2023	Promotes repairability of textile products to extend their lifecycle and reduce waste.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	**Sale of goods directive**	2019	Protects consumer rights regarding product quality and sustainability claims.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	**Unfair commercial practices directive**	2017	Addresses misleading marketing practices, including false environmental claims, false advertising, deceptive marketing, and other unfair practices.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	**The climate & resilience law - environmental labelling for products**	2021	Introduces mandatory environmental labelling for textile products to inform consumers.	Requires textile firms to provide clear environmental impact labels on products, encouraging transparency and promoting sustainable consumer choices.
EU	**VAT Reduction on Repair**	2022	Provides incentives for repair services to encourage product longevity and reduce waste which may indirectly impact TF firms	Encourages textile firms and consumers to prioritise repair over replacement by making repair services more financially accessible.

4.5. Reporting regulations across the value chain

Regulations in the regulatory category of Reporting are relatively evenly distributed across the Yarn & Fabric Production, Cut & Sew, and Retail tiers, see Table 9. These tiers of the value chain are subject to transparency requirements, including sustainability disclosures, value chain due diligence, and corporate environmental reporting. The presence of indirect reporting regulations at these tiers further emphasises the expectation for firms to track and disclose sustainability-related data, see Figure 13.

However, the absence of direct reporting regulations at the Consumer Use stage shows a gap in monitoring how consumers engage with textile fashion post-purchase. Since consumer behaviour impacts environmental outcomes, such as longevity and disposal choices, this regulatory gap suggests an opportunity to improve reporting mechanisms that track end-user engagement with sustainability claims.

Circular End-of-life management has less reporting regulations than upstream production and Retail tiers. This indicates that while some accountability exists for waste management, there may be insufficient transparency regarding what happens to textiles after use. The lack of indirect regulations in this category further shows that reporting expectations in circularity remain underdeveloped. Strengthening reporting requirements at this stage could improve oversight of compliance with textile fashion disposal and recycling rates, while also supporting future policies on extended producer responsibility.

Overall, our findings indicate that reporting requirements are primarily concentrated at the upstream production and retail tiers but weaker downstream at the consumer-use and circularity tiers. Addressing these regulatory gaps could improve data transparency across the full lifecycle of textiles, supporting ecolabel credibility.

Figure 13. Regulatory impact of Reporting legislations across the TFI value chain.
Direct (blue) and indirect (yellow) impacts across different value chain tiers.
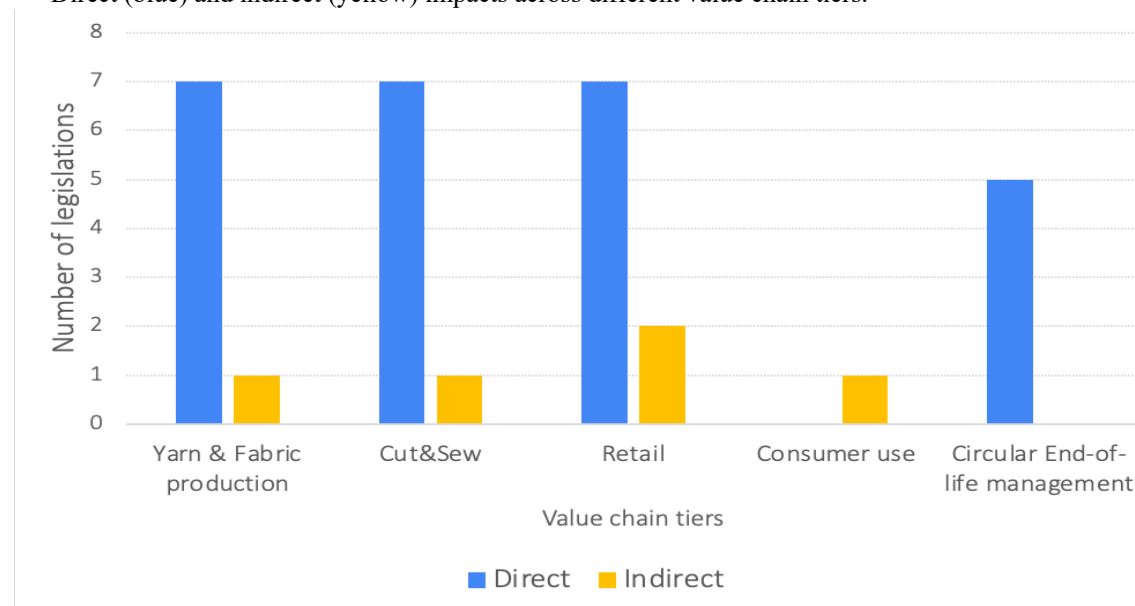
Table 9. Legislations in the regulatory category Reporting.

Jurisdiction	Legislation	Year	Short Description	Brief context of the impact on TFI
EU	**Corporate sustainability due diligence directive (CSDDD)**	2022	Requires due diligence on environmental impacts and value chain transparency across production tiers.	Mandates that TFI firms integrate sustainability into their business practices and value chains. Requires due diligence on environmental and human rights impacts, enforcing risk assessments, monitoring systems, and sustainability compliance across all production tiers. Firms must publicly report their due diligence efforts, with non-compliance leading to legal and reputational risks.
EU	**Corporate sustainability reporting directive (CSRD)**	2022	Mandates reporting on environmental impacts, including carbon emissions and waste, across all value chain tiers.	Requires TFI firms to enhance sustainability disclosures by reporting on their environmental, social, and governance (ESG) impacts, including carbon emissions and waste. Firms must provide transparent, standardised, and comparable data to investors, consumers, and regulators.
EU	**Strategic environmental assessment directive**	2001	Requires assessments of environmental impacts for large-scale projects, including textile-related developments.	Promotes the use of renewable energy in TFI production. Firms must increase reliance on renewable sources to align with national sustainability targets.
EU	**Duty of Vigilance Law**	2017	Mandates environmental and human rights due diligence across value chains.	Obligates textile firms to identify and mitigate environmental and human rights risks across their value chains, increasing corporate accountability.
EU	**Penalty for Ultra-Fast Fashion Products**	2024	Imposes penalties on ultra-fast fashion products failing to meet sustainability standards.	Discourages the overproduction of low-quality garments by penalising firms that fail to meet environmental and social responsibility standards.
EU	**Value Chain Act (Lieferkettengesetz or value Chain Due Diligence Act)**	2023	Mandates environmental and human rights due diligence across value chains.	Requires textile firms to assess and report environmental and social risks in their value chains, ensuring compliance with sustainability and ethical standards.
EU	**Act on Corporate Due Diligence Obligations in value Chains**	2023	Requires companies to assess and report on environmental risks in their value chains.	Obligates textile firms to integrate sustainability into their business models by identifying, mitigating, and reporting risks related to human rights and environmental impacts.
EU	**Responsible & Sustainable Business Act**	2024	Aims to integrate sustainability practices and accountability across business operations by mandating that businesses demonstrate due diligence in ensuring their operations and suppliers adhere to human rights and environmental standards.	Requires textile firms to ensure responsible business practices by addressing sustainability risks and ethical concerns throughout their value chains.

Country	Regulation	Year	Description	Impact
USA	**Securities and Exchange Commission (SEC) Final Rule on Climate-Related Disclosures for Investors**	2024	Mandates climate-related disclosures for publicly traded companies, including textile firms.	Firms, factories, and production facilities must report on greenhouse gas emissions, including Scope 3 (value chain) emissions, if material or included in climate goals. This will require upstream suppliers to provide emissions data.
USA* *State jurisdiction	**California's greenhouse gases: climate-related financial risks bill**	2023	Establishes reporting requirements on climate-related financial risks for companies.	Fashion firms must publicly disclose detailed information about their greenhouse gas emissions, including those from their value chain.
Bangladesh	**Energy Efficiency Labelling Regulations 2023**	2023	Promotes consumer awareness through energy labelling of products.	Promotes energy-efficient appliances, which are often used in textile production facilities, encouraging energy-efficient production and reducing environmental impact.

4.6. Regulatory compliance in the Retail: Legal obligations and legislative geographic distribution

The presence of regulations in reporting across multiple regions, especially in Europe and North America show a growing emphasis on corporate transparency and accountability. The findings in Table 10 and Figure 14, point to regional differences in regulatory focus across different environmental regulatory categories.

Europe has the highest number of regulations across all categories, particularly in circular end-of-life management, where it currently dominates the legislative landscape. This is in line with EU policy's emphasis on waste reduction, recycling, and circular economy principles. North America e.g. USA, shows a relatively balanced regulatory presence, but with fewer total and national legislations.

Table 10. Distribution of legislations with DIRECT LEGAL impact for retailers categorised by regulatory category.

Legislative geographic distribution	Regulatory category			
	Climate, Emissions & Energy	Circular end-of-life management	Consumer goods certification	Reporting
Africa	--	1	--	--
Asia	--	2	--	--
Europe	--	12	10	7
Europe-Asia (Turkey)	--	1	--	--
North America*	1	1	--	2
Total legislations	**1**	**17**	**10**	**9**

*The legislations listed in this table include those applicable at both the federal level in the United States and within individual state jurisdictions.

Africa and Asia have limited legislative coverage (Table 10), with only a few regulations related to circular end-of-life management. Not surprisingly, the two African nations included in this study are top importers of only used clothes from the UK. This highlights the reliance on second-hand clothing markets as a primary waste management strategy, rather than formal regulatory frameworks that promote circularity within domestic industries. The limited legislative focus on textile waste in these regions raises concerns about the long-term sustainability and environmental impact of such trade dynamics.

Figure 14 also highlights that Climate, emissions, and energy regulations are the least represented category, with only a single instance in North America. This suggests that while sustainability efforts focus on waste management and reporting, there is currently less direct regulatory pressure on emissions reduction in the textile sector.

Overall, our findings underscore the EU's leadership in regulatory frameworks for sustainable practices and highlight gaps in other regions. This discrepancy may impact global value chains, as firms operating in multiple jurisdictions must navigate differing regulatory expectations. The findings also suggest an opportunity for stronger climate and emissions-related legislation in other regions, aligning sustainability regulations with broader

environmental goals. Notably, there is a concerning gap between the urgency of regulatory reform and the industry's concerns and pace of adaptation as 63 percent of brands are behind on their 2030 decarbonisation goals, and only 18 percent of fashion executives view sustainability as a top-three risk for growth in 2025, down from 29 percent in 2024 (McKinsey & Company, 2025).

Our findings highlight an opportunity for stronger climate and emissions-related legislation to align sustainability regulations with broader environmental goals. Given that all the countries included in this study have signed the Paris Agreement (UNFCCC, 2024), there is a clear mandate to reduce emissions and promote sustainability. However, the relatively low number of regulations in the Climate, Emissions, and Energy categories suggests that many jurisdictions have yet to translate their commitments into legally binding measures within the textile sector. Strengthening these regulations would improve alignment with international climate targets and ensure more comprehensive environmental governance across global value chains.

The limited legislative coverage in Africa and Asia, particularly regarding circular end-of-life management, weakens the effectiveness of ecolabels by limiting regulatory enforcement and market influence. With many countries relying on second-hand clothing markets instead of formal circularity policies, ecolabels face challenges in driving systemic environmental improvements. Furthermore, the lack of Climate, Emissions, and Energy regulations outside the EU creates inconsistencies in sustainability standards across global markets. While all countries in this study have signed the Paris Agreement, the weak regulatory presence indicates a gap between commitments and their implementation. Strengthening climate and emissions-related policies could enhance the credibility of ecolabels by ensuring they align with enforceable regulations, ultimately improving their impact across global value chains.
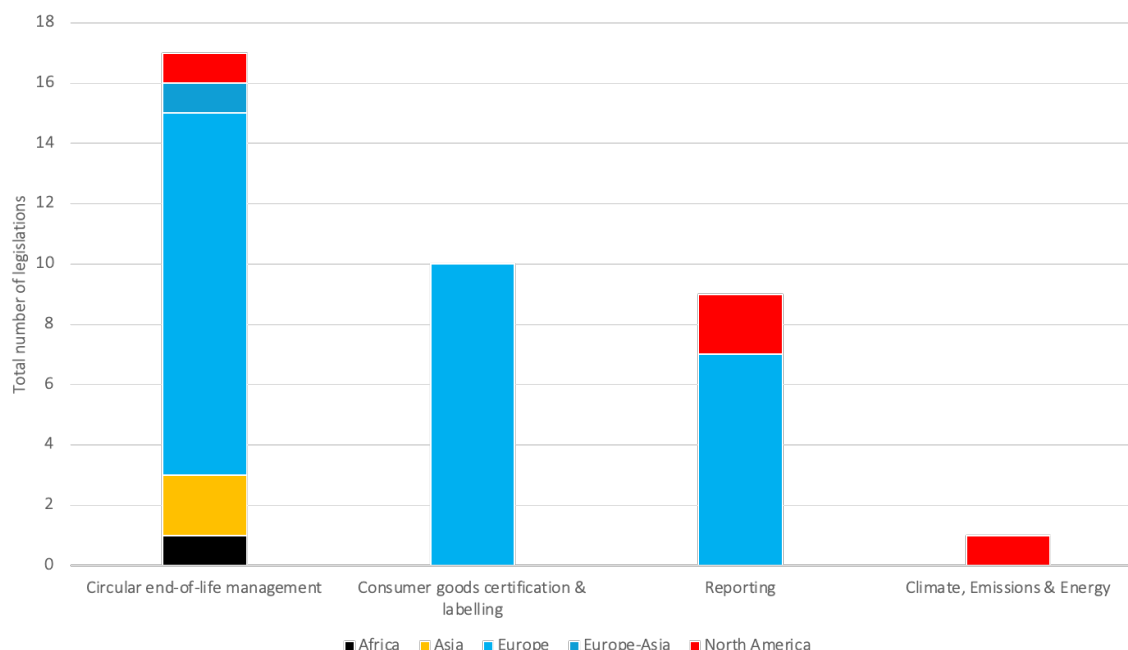
Figure 14. Distribution of regulatory categories with which the value chain tier "Retail" is legally required to comply.
Note: Legislations listed in this table include those applicable at both the federal level in the United States and within individual state jurisdictions.

5. Key benefits and challenges of implementing eco-credential standards and the impact of international legislation

Our findings highlight both the challenges and benefits of implementing eco-credential standards within the UK's TFI, as well as the influence of international regulatory frameworks on their effectiveness. Understanding these challenges and benefits is crucial, as these insights offer valuable guidance for improving sustainability management in global value chains and can contribute to broader adoption of sustainable practices within the industry. In Table 11, we present a summary of the challenges and benefits identified in our findings.

Table 11. Challenges of implementing eco-credential standards in the UK's TFI and benefits and opportunities for strengthening regulatory influence.

	Climate change, Emissions & Energy	Circular end-of-life management	Consumer goods certification & labelling	Reporting
BENFITS	**Aligning regulatory frameworks for more efficient ecolabels** The Retail tier is indirectly impacted, as firms must comply with broader climate and energy policies, including corporate sustainability reporting and energy efficiency standards. This presents an opportunity to align ecolabel criteria with existing regulations, improving their credibility and effectiveness. Strengthening downstream policies such as carbon footprint disclosures for consumers and incentives for sustainable clothing care, could enhance ecolabel use and support lifecycle emissions reduction. Aligning ecolabel requirements with corporate sustainability reporting directives could further strengthen regulatory efforts.	**Aligning circularity with consumers for lasting impact** The increasing regulatory presence in Circular End-of-Life Management, particularly in upstream production and Retail, shows a strong policy commitment to waste reduction and recyclability. High compliance requirements, suggest a growing emphasis on transparency and accountability throughout the value chain. This is an opportunity for Retail to lead circularity efforts by aligning ecolabels with existing regulations and leveraging their influence over consumer behaviour. Strengthening policies at the Consumer Use stage, such as regulations promoting product longevity, sustainable care practices, and responsible disposal, may enhance the overall impact of eco-credential standards.	**Integrating Consumer use to enhance ecolabel effectiveness** The strong presence of regulations for Retail regarding Consumer goods certification & labelling, indicates a growing emphasis on corporate accountability and transparency. This is an opportunity to align ecolabel policies with existing regulations, ensuring they serve as reliable tools for informing consumer choices and reinforcing environmental efforts. Strengthening policies to include clearer ecolabel criteria, improve consumer education, and ensure stricter enforcement could boost ecolabel credibility, reduce greenwashing, and influence consumer behaviour. Closing these gaps may not only influence purchasing decisions but also contribute to long-term improvements in textile circularity leading and increased effectiveness of ecolabels.	**Strengthening Reporting for Greater Ecolabel Transparency** Report regulations play a crucial role in increasing corporate accountability and closing jurisdictional loopholes. New legislative reporting initiatives, push firms to disclose detailed environmental impact data, impeding relocation of production to avoid scrutiny. Public transparency requirements enhance ecolabel credibility. Also, consumer demand for less environmental impacts can incentivise firms to adopt eco-credentials that exceed legal requirements, positioning ecolabels as key market drivers. Strengthening reporting at the consumer and circularity stages may further improve transparency, ensuring eco-credential standards reflect environmental performance throughout the lifecycle.
CHALLENGES	**Regulatory impacts vary across value chain tiers** The regulatory impact of Climate, Energy, and Emissions policies varies across different value chain tiers. While upstream production tiers are heavily regulated due to their high energy consumption and emissions, downstream tiers remain largely unregulated. This regulatory gap limits the effectiveness of eco-credentials in addressing emissions throughout the product lifecycle, particularly in areas such as consumer behaviour, product lifespan, and disposal. As a result, ecolabels related to retail, consumer use, and circularity lack strong regulatory support, hindering comprehensive sustainability improvements.	**Regulatory impacts vary across value chain tiers** Despite strong regulatory focus on waste reduction, recycling mandates, and extended producer responsibility policies, particularly in production, retail and waste management, the Consumer use tier sees minimal direct regulation. This weak oversight may limit the effectiveness of ecolabels aimed at encouraging sustainable disposal and textile longevity, as there is little policy support to drive consumer participation in circular practices. Without better alignment between material choices, consumer behaviour, and end-of-life processing, ecolabels alone will struggle to promote full lifecycle sustainability.	**Regulatory support is weak for circularity certifications** Regulations are strongest in upstream production and Retail tiers, while Consumer Use and Circular End-of-Life Management remain underregulated. This imbalance limits the effectiveness of ecolabels in guiding sustainable consumer behaviour and ensuring responsible end-of-life management for textiles. The relatively weak focus on circularity certifications, suggests that while sustainability claims are established at the production stage, they do not always translate into real-world circularity outcomes. Without stronger regulatory support, ecolabels in these areas will lack credibility and not be effective in contributing to better waste management and disposal practices.	**Regulatory gaps affect ecolabel effectiveness** Firms in upstream production and Retail tiers, are required to disclose sustainability data, conduct value chain due diligence, and meet corporate environmental reporting standards. Consumer Use and circularity stages remain underregulated, limiting transparency on post-purchase environmental impacts. There are no reporting requirements to track consumer behaviour, indicating the challenge of understanding how textiles are used and discarded. While circularity has some direct reporting regulations, the lack of indirect requirements results in weak oversight of textile disposal, recycling rates, and extended producer responsibility compliance. These gaps hinder ecolabels credibility and efficiency.

6. Conclusions and recommendations

Our findings highlight that the effectiveness of eco-credential standards depends on their alignment with both domestic and international regulations. While regulations are robust in the upstream production and retail tiers, significant gaps remain in circular end-of-life management and consumer use, where ecolabels currently lack regulatory backing. These gaps limit ecolabels' ability to influence consumer decisions and restrict their impact on full lifecycle sustainability.

Strengthening regulatory reporting requirements would enhance ecolabel credibility and enable better assessment of their impact on sustainability outcomes. Currently, corporate environmental impact reporting exists, but there is no comparable framework for tracking consumer behaviour or post-consumer textile disposal – an oversight that weakens the effectiveness of eco-credential standards.

Our study set out to examine the challenges and benefits of implementing eco-credential standards in the UK's TFI and the influence of international regulatory frameworks on their effectiveness. Findings indicate a global regulatory shift towards circularity-focused policies, with producer accountability gaining traction. However, regulatory gaps in downstream activities prevent ecolabels to harness consumer demand for sustainable textiles. This misalignment represents a missed opportunity to increase environmental sustainability through informed consumer choices.

Additionally, as TFI lead firms anticipate growth driven by increasing volumes rather than prices(McKinsey & Company, 2025), sustainability objectives need stronger regulatory reinforcement to ensure that industry expansion aligns with environmental goals.

Given the UK's evolving post-Brexit regulatory landscape, there is an opportunity to set global benchmarks by harmonising ecolabel criteria with domestic and international sustainability frameworks. This would support a cradle-to-grave approach, embedding environmental sustainability throughout the textile product lifecycle and strengthening the role of ecolabels in contributing to advancing global sustainability management.

6.1. Recommendations for improving TFI value chain environmental sustainability

In sum, strengthening regulatory support at the consumer use and end-of-life stages, improving transparency in reporting, and aligning ecolabels with existing frameworks could significantly increase the effectiveness of eco-credential standards. These measures would not only promote a full lifecycle approach to sustainability but also foster long-term growth by integrating sustainability into all stages of production and consumption.

We outline the following four recommendations for key actions:

◊ **Align material choices, consumer behaviour, and circular end-of-life management across the value chain**: To boost the effectiveness of

ecolabels, policies need to harmonise material choices, consumer behaviour, and circular end-of-life management throughout the entire value chain.

◊ **Support circularity certifications**: There is a need for greater regulatory support for circularity certifications, particularly at the consumer use and end-of-life phases. This support could include promoting transparency in recycling rates, improving product take-back schemes, and incentivising product designs that facilitate recycling.

◊ **Strengthen consumer-focused regulations**: Regulations promoting consumer behaviour should be enhanced, including standardised labelling and clear guidance on disposal. Such measures would increase ecolabel credibility, reduce the prevalence of greenwashing, and encourage more sustainable consumption practices.

◊ **Leverage cradle-to-grave ecolabels and firm proactiveness**: Policymakers can capitalise on the significant increase in cradle-to-grave ecolabels, reflecting a circular management approach. This trend demonstrates that firms can act proactively, often responding to shifting consumer attitudes, anticipating future legislation, and moving faster than policymakers. By aligning regulations with these proactive industry practices, policymakers can formalise circular management approaches and better integrate voluntary ecolabels.

6.2. Limitations and areas for future research

While our study focuses on the TFI value chain, it is important to note that the global TFI operates within a more complex system beyond any value chain perspective. As such, our research has limitations that offer opportunities for future exploration. We did not conduct a deep textual analysis of legislation to identify synergies, gaps, or contradictions, nor did we address social aspects, which are vital to understanding sustainability as defined by policy (WCED, 1987, p. 73).

Future research should incorporate social dimensions and a broader range of environmental factors using frameworks like *regulatory ecology* (Cornell and Sjåfjell, 2024) to explore how markets, law, and social norms shape sustainable business. This would offer deeper insights into the relationship between social systems and the natural environment, providing a clearer understanding of how sustainability efforts interact with broader societal contexts.

Additionally, further research is needed on the extended business ecosystem of UK TFI firms of varying sizes to understand how regulatory impacts influence operations. This would enable a more nuanced understanding of how regulations play out across diverse business models, supporting more effective and inclusive sustainability strategies within the industry

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