



Understanding Circular Economy Adoption Challenges in Fashion: A PRISMA-Based Review

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Abstract

The fashion industry is increasingly identified as a critical sector for circular economy (CE) adoption due to its high resource intensity and waste generation. Despite growing academic and policy interest, the transition from linear to circular models in fashion remains limited. This paper synthesises existing literature to identify and interpret the key barriers hindering circular economy adoption in the fashion industry. Using a systematic review approach guided by PRISMA 2020, the study draws on peer-reviewed research to develop a thematic understanding of structural, economic, technological, behavioural, and supply-chain-related constraints. The findings indicate that circular fashion initiatives are constrained by misaligned stakeholder incentives, high implementation costs, technological limitations, persistent fast-fashion consumption patterns, and fragmented global supply chains. Rather than presenting an exhaustive classification, this paper offers a concise, practice-oriented synthesis of dominant barriers and discusses why they continue to persist. The study contributes to ongoing sustainability discourse by highlighting the need for coordinated, system-level interventions to enable scalable circular transitions in the fashion sector.

Keywords: Circular economy; Fashion industry; Sustainability; Barriers to adoption; Systematic literature review

1. Introduction

The fashion industry contributes significantly to global economic growth while simultaneously exacerbating environmental degradation and social inequities. Textile production, dyeing, and apparel manufacturing account for high levels of waste, water consumption, and carbon emissions, making the industry one of the most resource-intensive sectors worldwide (Gazzola et al., 2024). In response to these challenges, the circular economy (CE) paradigm has gained prominence as a transformative approach to sustainable development, advocating for extended product life cycles through reuse, recycling, and regenerative design (de Aguiar Hugo et al., 2021; Gazzola et al., 2024). The CE model challenges the traditional linear “take-

make-dispose” system by prioritising material efficiency and closed-loop flows, thereby reducing environmental impact and enhancing resource productivity.

Despite the conceptual appeal of CE principles, the transition from linear to circular systems in the fashion industry remains slow and fraught with barriers. Prior research indicates that, although numerous CE initiatives are emerging across supply chains, progress toward meaningful circularity is constrained by a range of economic, technological, institutional, and social factors (de Aguiar Hugo et al., 2021). For instance, consumer awareness and behaviour often lag behind the increasing discourse on sustainable fashion, limiting the adoption of circular practices at scale (Jimenez-Fernandez et al., 2023). Additionally, high costs associated with technology adoption and a lack of regulatory frameworks further impede the operationalisation of CE strategies in practice (Gazzola et al., 2024).

Research addressing CE adoption in fashion has proliferated over the past decade, encompassing empirical studies, conceptual frameworks, and systematic reviews. A notable empirical contribution by Singh and Kumar (2025) extended the Theory of Planned Behaviour (TPB) to identify consumer-side enablers that facilitate sustainability adoption in fashion, emphasising the importance of environmental knowledge and accessible return channels for used garments in shaping positive attitudes toward CE practices. Their findings underscored that consumer perceptions and behavioural intentions form a crucial component of the broader sustainability transition (Singh & Kumar, 2025). However, while such empirical investigations contribute important insights into adoption mechanisms, they do not fully explicate the structural obstacles that designers, producers, and policymakers confront when operationalising CE at organisational and systemic levels.

A growing body of literature has sought to synthesise these fragmented insights through review-based approaches. For example, de Aguiar Hugo et al. (2021) conducted a systematic review to map drivers, barriers, and practices influencing CE implementation in the fashion industry, highlighting persistent obstacles such as consumer resistance, cultural norms favouring fast fashion, and limited institutional support. Their analysis revealed that while drivers for CE adoption are present, barriers outnumber facilitators, thereby slowing progress toward comprehensive circular models (de Aguiar Hugo et al., 2021). Other studies corroborate these findings, noting that technological limitations, supply chain complexity, and lack of economic incentives further complicate efforts to achieve circularity (Saif et al., 2024; Shamsuzzaman, 2025).

Although the existing literature identifies various barriers at different levels of the fashion value chain, there remains a need for an updated synthesis that logically organises these challenges into thematic clusters to inform both academic inquiry and managerial decision-making. Furthermore, as global and regional contexts differ in regulatory landscapes, consumer behaviour, and market dynamics, a structured review can illuminate universal barriers while acknowledging contextual nuances. This paper aims to meet these needs by systematically reviewing the literature on barriers to CE adoption in the fashion industry, guided by the PRISMA framework, and articulating key thematic insights to support future research and practice.

2. Literature Review

The concept of *circular economy* (CE) has gained substantial traction as a sustainability framework aiming to transform traditional linear economic models—characterised by “take-make-dispose”—into systems that prioritise resource efficiency, waste reduction, and closed-loop material flows (de Aguiar Hugo et al., 2021; Kirchherr et al., 2017). Originating in broader sustainability discourse, CE emphasises designing out waste, extending product life cycles, and regenerating natural systems, aligning with sustainable development goals across industries, including fashion (de Aguiar Hugo et al., 2021). Despite its theoretical appeal, research consistently reveals that translating circular principles into practice within the fashion sector remains limited and challenging, with structural and behavioural barriers impeding widespread adoption.

The *fashion industry* is one of the most visible and resource-intensive sectors globally, contributing heavily to water use, carbon emissions, and waste generation due to mass production, short product lifespans, and rapid consumption patterns (Carvalho et al., 2025; Saha, 2024). This problematic context has led researchers to explore CE as a pathway to mitigate environmental damage while supporting social and economic sustainability (de Aguiar Hugo et al., 2021; Saha, 2024). In particular, literature on fashion circularity often focuses on strategies such as eco-design, reuse, recycling, product life extension, and supply chain transformation as potential levers for sustainable transition (Dissanayake & Weerasinghe, 2022; Shamsuzzaman, 2025). However, scholars also emphasise that such strategies face substantial barriers that limit their effectiveness in real-world implementation.

A significant body of work identifies *barriers operating at multiple levels* of the fashion value chain. At the *institutional and policy level*, regulatory uncertainty and weak enforcement slow the mainstreaming of circular practices (de Aguiar Hugo et al., 2021; Patruți, 2024). For instance, despite increasing regulatory interest in CE frameworks, many jurisdictions lack clear policies supporting eco-design standards or extended producer responsibility, contributing to fragmented adoption (Saha, 2024; Patruți, 2024). This structural gap aligns with broader evidence showing that policy and institutional barriers can diminish incentives for firms to invest in circular transitions (de Aguiar Hugo et al., 2021).

At the *economic and operational level*, high implementation costs and limited financial incentives pose persistent challenges for fashion firms, especially small and medium enterprises (Saha, 2024; Shamsuzzaman, 2025). While technology offers promise for improving material recovery and design efficiency, its deployment often entails significant capital expenditure and expert knowledge, discouraging widespread uptake (Shamsuzzaman, 2025; Raman, 2025). Furthermore, supply chain complexity in fashion—with multiple tiers of suppliers and varied material types—compounds coordination difficulties, making it hard to standardise circular processes across geographies and product lines (Shamsuzzaman, 2025; Raman, 2025).

Consumer behaviour and social barriers also emerge strongly in the literature. Fast-fashion consumption patterns—driven by low prices, trend cycles, and convenience—undermine sustainable purchasing and product longevity, reducing the effectiveness of circular strategies like reuse and repair (de Aguiar Hugo et al., 2021; Carvalho et al., 2025). Consumer awareness and engagement with circular fashion concepts remain limited, often due to inadequate information or higher perceived costs of sustainable options (de Aguiar Hugo et al., 2021; Saha, 2024). These behavioural constraints reflect broader social barriers that entrench linear consumption norms despite growing sustainability discourse.

Several studies also call attention to *technological and infrastructural constraints* that hinder circular practices. Mixed-material garments and insufficient recycling infrastructure limit the ability to recover high-value inputs, while the absence of standardised material tracking mechanisms complicates closed-loop systems (Carvalho et al., 2025; Shamsuzzaman, 2025). Additionally, literature points to a *lack of integration*

between CE initiatives and broader strategic frameworks within firms, often resulting in isolated pilot projects that fail to scale (de Aguiar Hugo et al., 2021; Saha, 2024).

While barriers to CE adoption are well documented, literature also highlights research gaps in understanding how these challenges interact across levels and contexts. Many existing reviews focus on individual aspects of circularity (e.g., recycling) or specific geographies, leaving a need for comprehensive synthesis that integrates cross-level insights on barriers (de Aguiar Hugo et al., 2021; Patruți, 2024). Moreover, empirical evidence on how organisational strategies can overcome these barriers remains fragmented and limited, emphasising the need for in-depth frameworks to guide future research and practice.

3. Methodology: PRISMA-Based Systematic Review

To ensure transparency, reproducibility, and methodological rigour, this paper adopts the **PRISMA 2020** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework for conducting the systematic review process. Originally developed to enhance the reporting of systematic reviews and meta-analyses, the PRISMA 2020 guidelines comprise a comprehensive checklist and a flow diagram that guide researchers in systematically identifying, screening, and synthesising relevant literature (Page et al., 2021). Although PRISMA originated in health research, its structured approach is widely used in social sciences and management research where synthesis of heterogeneous studies is required (Page et al., 2021; PRISMA Statement, n.d.)

The systematic review followed several sequential steps aligned with PRISMA recommendations. First, a clear **research objective** was established: to identify and synthesise scholarly evidence on barriers to circular economy adoption in the fashion industry. Following this, a comprehensive **search strategy** was formulated to capture relevant literature from multiple electronic databases (e.g., Scopus, Web of Science, Google Scholar). The search terms were developed using combinations of keywords such as “circular economy”, “fashion industry”, “barriers”, “sustainability”, and “systematic review”.

Inclusion and exclusion criteria were defined prior to screening. Studies were included if they (1) addressed barriers, challenges, or limitations associated with CE adoption in fashion or related apparel and textile contexts, (2) were published in peer-reviewed journals or reputable conference proceedings, (3) were written in English, and (4) were available in full text. Exclusion criteria removed studies that focused solely on drivers without addressing barriers, were opinion pieces without empirical or conceptual analysis, or were outside the scope of CE in fashion.

The **screening process** involved several stages. Initially, duplicates were removed. Titles and abstracts of the remaining records were screened against the inclusion criteria. Subsequently, full texts of potentially eligible articles were reviewed for final inclusion. At each stage, reasons for exclusion were documented to ensure an audit trail and methodological transparency. A **PRISMA flow diagram** summarising the identification, screening, eligibility assessment, and final inclusion is provided in the results section, demonstrating how the initial search results were systematically refined into the set of studies synthesised in this review (PRISMA Flow Diagram – PRISMA-2020).

Following selection, data extraction was performed using a structured template that captured key information from each included article: authors’ names, year of publication, research context, methodological approach, and specific barriers identified. This facilitated comparative analysis and thematic categorisation of barriers across studies. The thematic synthesis of extracted data followed iterative coding, allowing related challenges to be clustered into broader barrier categories for conceptual clarity.

By adhering to PRISMA 2020 guidance, the methodology ensures that the review is systematic, transparent, and replicable, addressing potential biases inherent in traditional narrative reviews and enabling a consolidated synthesis that supports credible conclusions (Page et al., 2021).

Barrier Theme	Description	Representative Sources
Policy and Regulatory Gaps	Inconsistent regulations, weak enforcement of circular policies, and absence of mandatory take-back or EPR mechanisms limit large-scale adoption of circular practices	de Aguiar Hugo et al. (2021)
High Economic Costs	High initial investment for circular infrastructure, recycling technologies, and sustainable materials reduces firms' willingness to transition	Shamsuzzaman (2025)
Technological Limitations	Limited availability of scalable recycling and sorting technologies, especially for blended textiles, constrains closed-loop production	Carvalho (2025)
Consumer Behavioural Resistance	Preference for low-cost fast fashion and limited engagement in reuse or take-back practices weakens demand for circular products	Singh & Kumar (2025)
Supply Chain Fragmentation	Lack of coordination and information sharing among supply-chain actors restricts implementation of integrated circular systems	de Aguiar Hugo et al. (2021)

Table 1: Key Barriers to Circular Economy Adoption in the Fashion Industry

4. Discussion: Why These Barriers Persist

The persistence of circular economy (CE) barriers in the fashion sector reflects a deeper structural problem: circularity requires coordinated change across systems that were historically designed for low-cost, high-speed, and high-volume production. Even where sustainability awareness is rising, the fashion industry's dominant logic remains anchored in fast-fashion cycles, globalized sourcing, and price competition, which collectively weaken the incentives for long-term circular investments (de Aguiar Hugo et al., 2021). The literature suggests that CE adoption is often constrained not by a lack of conceptual models, but by the difficulty of translating those models into commercially viable, scalable, and socially accepted practices across diverse contexts (Carvalho, 2025; Shamsuzzaman, 2025).

A key reason these barriers persist is the **misalignment of incentives across stakeholders**. Circularity depends on cooperation between designers, manufacturers, brands, consumers, recyclers, and regulators, yet these actors frequently face conflicting priorities. For example, brands may pursue limited circular initiatives to meet reputational goals, but upstream suppliers may lack the financial capacity or technical

resources to redesign materials and processes for circularity (de Aguiar Hugo et al., 2021). Similarly, recyclers and waste handlers often operate in fragmented systems with limited traceability and inconsistent quality standards, which makes closed-loop recovery difficult to scale (Carvalho, 2025). This fragmented incentive structure creates a “coordination failure,” where circular systems cannot mature because no single actor can justify bearing the cost of system-wide transformation.

Barriers also persist because **economic and technological constraints reinforce each other**. The cost of circular transition remains high partly due to limited infrastructure, and infrastructure remains limited because demand and investment are uncertain. For instance, recycling technologies capable of processing blended fabrics and maintaining fibre quality are still emerging, which restricts material recovery and raises costs (Shamsuzzaman, 2025). When circular materials are expensive or inconsistent in quality, firms struggle to integrate them into production without compromising pricing strategies or product performance. In such conditions, firms tend to view circularity as a strategic risk rather than an operational advantage, slowing diffusion beyond a small set of early adopters.

On the consumer side, the literature highlights a persistent **attitude–behaviour gap** that continues to sustain linear consumption patterns. While many consumers express pro-environmental attitudes, actual purchase and disposal behaviour often prioritises affordability, trend responsiveness, and convenience (de Aguiar Hugo et al., 2021). Evidence from consumer-focused research in fashion sustainability indicates that behavioural intention is shaped not only by awareness but also by perceived control and practical availability of circular options—such as accessible take-back channels, reliable resale systems, and transparency in product claims (Singh & Kumar, 2025). Where these conditions are weak, circular consumption remains an aspirational ideal rather than a habitual practice. This demand-side limitation reinforces the supply-side reluctance to invest in circular business models.

Another explanation for persistence is that CE implementation in fashion often occurs as **isolated interventions** rather than embedded transformation. Many initiatives emphasize a single strategy (e.g., recycling collections or resale platforms), but circularity requires complementary changes across product design, supply chain logistics, and consumer engagement. When circular projects operate without supportive regulation, infrastructure, and market readiness, they remain small-scale and fail to disrupt the dominant linear system (de Aguiar Hugo et al., 2021). This is particularly evident in developing and emerging economies, where infrastructural and financial constraints reduce the feasibility of reverse logistics, formal recycling, and material recovery systems at scale (de Aguiar Hugo et al., 2021).

Finally, the persistence of barriers reflects an underlying **governance and legitimacy challenge**. Circularity requires standards for recycled content, traceability, product durability, and environmental claims yet inconsistent standards and limited enforcement weaken trust and slow adoption (Carvalho, 2025). Without credible verification systems, consumers may doubt sustainability claims, and firms may hesitate to invest in circular strategies that lack regulatory clarity and market validation. Thus, the literature indicates that persistent barriers are maintained by a combination of structural lock-ins, weak coordination mechanisms, and uneven enabling conditions across contexts.

5. Conclusion

This study synthesised existing literature to identify dominant barriers hindering the adoption of circular economy (CE) principles in the fashion industry. The review highlights that despite growing academic, industrial, and policy interest in circular fashion, implementation remains constrained by a combination of structural, economic, technological, behavioural, and coordination-related challenges. The findings suggest that circularity in fashion is not impeded by a lack of conceptual understanding, but by persistent system-level constraints that reinforce linear production and consumption models. By offering a concise thematic

synthesis, this paper contributes to a clearer understanding of why CE adoption remains limited and underscores the need for integrated, multi-actor solutions to enable circular transitions in the fashion sector.

6. Limitations and Future Research

This study is subject to certain limitations. As a review-based paper, it relies on secondary sources and does not empirically assess the relative severity of identified barriers across contexts. Additionally, the synthesis draws primarily from peer-reviewed literature, which may underrepresent informal practices and region-specific insights, particularly in developing economies.

Future research could empirically validate the relative impact of these barriers using stakeholder surveys, interviews, or mixed-method approaches. Further studies may also explore context-specific pathways for overcoming circular economy barriers, with particular attention to emerging markets, informal recycling systems, and consumer engagement mechanisms that support scalable circular fashion models.

Statement of Declaration

We hereby declare that this manuscript is original, has not been published elsewhere, and is not under consideration by any other journal.

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