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CIRCULAR ECONOMY MODELS FOR FAST FASHION IN EMERGING MARKETS: AN INDIAN PERSPECTIVE

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Abstract - *Fast fashion's rapid production and consumption cycles have intensified the environmental concerns and waste management challenges. This has contributed significantly to environmental degradation, waste generation, pollution, and resource depletion. Emerging markets such as India, where apparel retail is growing at double-digit rates, face a dual challenge: sustaining economic growth while mitigating environmental damage. Circular economy (CE) principles focusing on reducing waste, reusing materials, and recycling offer a promising solution for this situation. This paper presents a literature review of CE models relevant to fast fashion in the Indian context. It identifies key enablers (digital technologies, extended producer responsibility, consumer awareness) and barriers (Lack of infrastructure, fragmented supply chains, limited investment) of circular fashion. The review synthesizes global best practices and proposes a conceptual framework for integrating CE strategies such as product-life extension, closed-loop supply chains, textile recycling, and shifting towards rental and re-sale models—into India's fast-fashion ecosystem. The findings highlight the need for cross sector collaborative initiatives among brands, policymakers, and consumers to achieve long-term sustainability in the Indian fast fashion industry.*

Keywords - Circular economy, fast fashion, sustainability, textile waste, recycle.

1. Introduction

Fast fashion—characterized by quick turnaround times, inexpensive garments, and high consumption rates—has amplified these environmental impacts. While the model has stimulated employment and affordable fashion access, its linear "take-make-dispose" approach places immense pressure on natural resources. Emerging economies such as India exemplify this paradox. India's s apparel market continues to expand due to rising disposable incomes, e-commerce penetration, and a youthful consumer base. Yet the country's infrastructure for textile recycling and formal waste management remains nascent. Informal sector dominance, low consumer awareness, technological limitations, and fragmented supply chains hinder sustainable practices. Without systemic change, the environmental cost of India's fast-fashion growth could outweigh its economic benefits.

CE provides a potential solution by decoupling economic growth from resource consumption. CE models emphasize designing products for longevity, reusing and recycling materials, and creating closed-loop production systems. The fashion industry needs to transit from its linear business model (take, make, and discard), to technology enabled circular business models-which include reduce, re-use, resell, recycle, rent, and repair-to ensure nothing is wasted. Research focusing on emerging economies—especially India—is comparatively limited. Existing studies highlight opportunities in digital tracking of materials, extended producer responsibility schemes, and collaborative consumption platforms, but also note challenges including inconsistent regulations and high upfront costs.

This paper aims to uncover best practices to support circular fashion practices in the Indian fast fashion landscape by consolidating insights from academic literature, government reports, and industry analyses.

2. Literature Review

2.1. Circular Economy: Principles and Frameworks

The circular economy (CE) is defined as an economic model that focuses on waste reduction, resource efficiency, and product longevity (Ellen MacArthur Foundation, 2013). Within the fashion sector, CE implementation

involves designing garments for longevity, using renewable or recycled fibers, enabling product take-back schemes, and employing digital tracking for material flow analysis (Bocken & Short, 2021). The fashion industry needs to transit from its linear business model (take, make, and discard), to technology enabled circular business models-which include reduce, resell, recycle, rent, and repair-to ensure nothing is wasted (Dhiwar & Bedarkar, 2024). These approaches seek to shift fashion's dominant linear model toward a restorative system that conserves resources and minimizes waste.

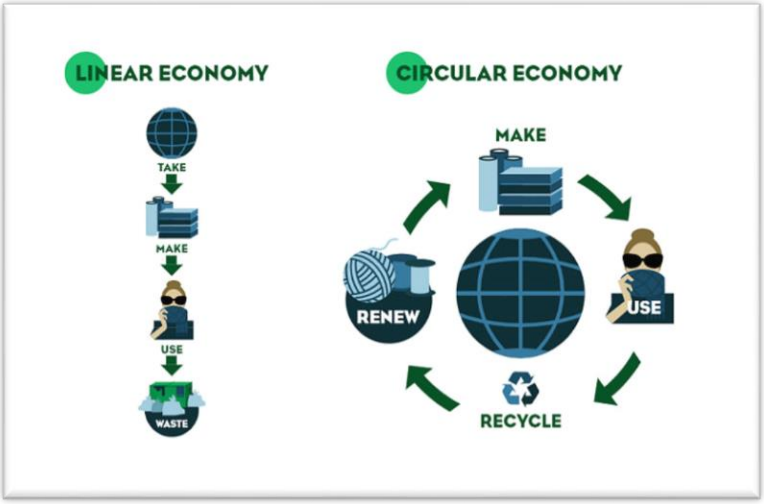


Fig 1: Linear & Circular Economy (Source: Fiber to fashion)

2.2. Fast Fashion and Environmental Impact

The global fashion industry is the second-largest polluter in the world. Fast fashion, known for its swift production of trendy and cost-effective clothing leaves an alarming environmental footprint.

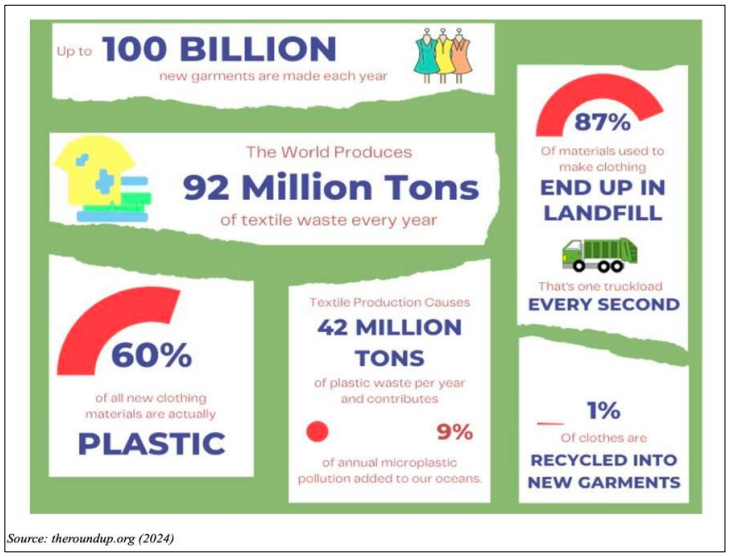


Fig 2: Key Statistics of Global Textile Waste (Source: Younus, 2025)

As per the above figure, out of the approximately 100 billion garments produced annually, nearly 92 million tons of textile waste is produced annually. 87% of textile waste which can be re-used or up cycled, ends up in landfills, and only 1 % of clothes are re cycled to new garments

The fast fashion sector heavily relies on synthetic fibres, waste water-intensive processes, and toxic dyes, which contribute to water pollution. Around 10% of carbon emissions worldwide are attributable to this sector, and it is expected to increase by 50% by 2030. As per the United Nations Environment Programme (UNEP) for a zero-waste future, it is imperative for brands to be accountable for concerns related to social and environmental sustainability

(Sutha, 2024).

2.3. Global Circular Economy Practices in Fashion

- Reduction of pre consumer Textile waste and post-consumer Textile waste:
  Pre-consumer textile waste arises from surplus materials produced during the design and manufacturing stages. These materials can be redirected back into production through recycling or repurposing, supporting zero-waste manufacturing approaches. In contrast, post-consumer textile waste is generated after the product has been used and discarded by consumers. Such waste can be minimized through strategies like donation, rental, reuse, resale, or recycling (Shakya, 2016).
- Design for longevity using recyclable materials: This involves creating garments and textiles that are durable and built to endure extended use, encouraging consumers to retain them for longer periods. This approach may incorporate high-quality or recyclable materials, custom or made-to-order production, multifunctional designs, and timeless, versatile styles that remain fashionable over time. Such strategies reduce the frequency of clothing replacement and promote long lasting use of existing garments.

- Sustainable material sourcing: The use of sustainable materials—such as organic cotton, hemp, Tencel, bamboo, and recycled polyester—and bio-based alternatives like mushroom leather and algae fibers, is transforming garment production. These materials offer a lower environmental impact compared to conventional fabrics(Kumar, 2025).
- Textile recycling and upcycling: Up-cycling is the practice to transform used clothing into new products without losing the quality of the original materials. E.g. turning old denim into bags. Recycling involves collecting and processing used clothing and textiles to be used as raw materials for new products (Jain, 2023).
- Closed-loop supply chains: This involves the collection and processing of materials from used products within the same company. These materials are reintegrated into the supply chain and repurposed to create new products, promoting resource efficiency and reducing waste (Jain, 2023). Fast fashion retailers such as H&M, Zara, and The Gap have implemented various clothing recycling or “take back” programs aim at reducing waste and addressing throwaway culture. This also incentivises consumers to return their old used clothes and earn discount on new merchandise (Younus, 2025).
- Repair and re-use programs: This strategy can be applied by offering customers “repair and alteration” services, which help prolong the lifespan of garments and decrease the demand for new clothing (Jain, 2023).
- Rental and resale: This practice enables customers to access affordable fashion through rental or shared use, while the sale of second-hand clothing promotes pre-owned fashion (Jain, 2023). H&M’s digital platform, Cos Resell and Sellpy are dedicated to second-hand fashion sales, further regulating overconsumption and disposal issues (H&M Annual Sustainability Report 2024).
- Just-in-time (JIT) model: The fashion industry can transition to a demand-driven model, minimizing waste from unsold inventory. For instance, Zara employs an efficient and sustainable production system that closely aligns with consumer demand. Their supply chain strategy focuses on producing limited quantities initially and restocking based on real-time demand, reducing overproduction and excess stock (Jain, 2023).
- Digital technologies like blockchain for improving supply chain sustainability for ensuring transparency and accountability in sourcing and recycling efforts. Additionally, the Digital Product Passport (DPP) system, Radio Frequency Identification (RFID), provides real-time insights into material usage and product lifecycle, supporting circular economy practices (Rehman, 2024).
  Technologies like 3D printing, digital pattern cutting, smart textiles, AI-powered Smart Garment Sorting System for textile recycling and AI tools to design helps the fashion brands to reduce wastage and efficiently utilize the resources (Rehman, 2024).
  CAD technology enables designers and brands to create garments and outfits digitally, eliminating the need for physical samples and prototypes. This approach reduces fabric waste and conserves other resources involved in textile production, such as water, energy, and transportation (Kumar, 2025).

Virtual fitting rooms as well as augmented reality (AR) promote sustainability by allowing customers to try on clothing virtually. These tools help decrease product returns, which in turn lowers the additional resource use and reduces unsold stock (Kumar, 2025).

2.4. Enablers to Circular Economy in the Indian Fashion Context

India has a long tradition of textile reuse, from resell to the raddiwala system to hand-me-down by donating practices, which aligns culturally with CE principles.

- Recent government initiatives such as the Extended Producer Responsibility Guidelines (2022) and the National Resource Efficiency Policy, indicate increasing regulatory backing.
- Digital Technology is another catalyst. E-commerce giants and domestic startups are experimenting with AI-driven demand forecasting, which can reduce overproduction.
- Consumer awareness - Customers are pressuring companies to make ethical and environmental changes as they pay more attention to the effects on the planet and future generations (Patrizia Gazzola et al. (2025).

2.5. *Barriers to Adoption*

Despite promising pilots, large-scale adoption is hindered by several challenges:

- high investment costs,
- Lack of infrastructure for recycling initiatives
- Lack of collaboration among stakeholders
- technological limitations, and
- low consumer awareness (Niinimäki et al., 2020).

3. Methodology

This study employs a comprehensive literature review of relevant journal papers, articles, academic papers, and published reports linked to the circular fashion concept. Each source was reviewed, and the findings were combined to highlight key CE strategies—such as product-life extension, closed-loop supply chains, textile recycling, and the adoption of rental and resale models to develop a conceptual framework for integrating circular economy (CE) strategies into India's fast-fashion sector.

4. Findings

Synthesizing these studies reveals major insights for Circular Economy Model for Fast Fashion in India:

- integrate design for durability,
- technology enabled traceability
- policy incentives and
- consumer engagement.

Significant research gaps remain, including

- lack of research on consumer willingness to participate in CE practices and
- lack of empirical assessment of CE initiatives in India.

5. Discussion and Conceptual Framework

Integrating Global Insights into the Indian Context

The literature review highlights that successful CE practices in fashion share three interdependent elements: product design for longevity, closed-loop supply chains, and active consumer participation. Applying these insights to India requires accounting for unique local conditions—rapid urbanization, a strong informal recycling sector, and price-sensitive consumers.

India's fast-fashion ecosystem is shaped by a diverse set of actors: global retailers, domestic brands, small and medium-sized manufacturers, informal waste pickers, and emerging digital platforms. For CE models to gain traction, collaboration across these stakeholders is essential. The government's Extended Producer Responsibility (EPR) guidelines (2022) provide an entry point, but enforcement and harmonization across states remain inconsistent.

Digital technology is a crucial enabler. Artificial intelligence (AI) can forecast demand more accurately, helping brands minimize overproduction. Blockchain-based digital product passports can trace garments from fiber sourcing to end-of-life, ensuring authenticity and easing resale or recycling. E-commerce platforms can facilitate consumer participation in take-back or rental programs by providing convenient collection logistics.

Conceptual Framework for a Circular Fast-Fashion Economy in India

Based on the reviewed literature and the Indian socio-economic context, a four-pillar conceptual framework is proposed:

Strategy Area	Key Actions
1. Design & Production for Circularity	• Create designs that simplify recycling and repair • Use AI-driven demand forecasting to reduce overproduction • Apply AI -based pre and post-consumer waste-reduction practices
2.**Technology-Enabled Supply-Chain Traceability**	• Use digital product passports and blockchain to track garments from production to post-consumer stage
3. Consumer Engagement	• Launch nationwide awareness campaigns on circular fashion • Promote garment rental and resale fashion • Offers/incentives on take-back programs by brands
4. Policy Incentives & Partnerships	• Provide GST reductions for products made from certified recycled textiles • Strengthen and enforce EPR guidelines to hold brands accountable • Develop programs to foster public–private partnerships and cross-sector collaboration

Table: 1 - Four-pillar conceptual framework

Challenges and Risks include economic feasibility, consumer behavior change, policy enforcement, and technological limitations. Mitigating these challenges calls for phased implementation, continuous stakeholder engagement, and adaptive policy instruments.

Conclusion

This paper synthesizes international and Indian literature on circular economy models for fast fashion, identifying both opportunities and barriers. Global best practices show that CE adoption hinges on integrated design, robust supply-chain traceability, and consumer engagement. In India, the presence of a vast informal recycling sector, rising digitalization, and growing policy interest provide a fertile foundation for circular practices—if properly supported.

Research Gaps

Future studies should address empirical assessment of CE initiatives in India, research on consumer willingness to participate in rental and resale schemes, and field trials of blockchain-based product passports and AI forecasting tools.

Implications for Practice

Policymakers can use this framework to craft incentives and regulations that balance economic growth with environmental responsibility. Brands and retailers can adopt technology-driven approaches to track materials and engage consumers in closed-loop systems. NGOs and community organizations can play a critical role in formalizing and supporting informal recyclers.

Final Remarks

As India's fashion market expands, the urgency for sustainable solutions intensifies. Transitioning from a linear to a circular model is not only an environmental necessity but also an economic opportunity to create green jobs,

reduce resource dependence, and enhance global competitiveness. By embracing a circular economy approach, India's fast-fashion industry can position itself as a leader in sustainable innovation among emerging markets.

Bibliography:

1. Bocken, N. M. P., & Short, S. W. (2021). Unsustainable business models – Recognising and resolving institutionalised social and environmental harm. *Journal of Cleaner Production*, 312, 127828. https://doi.org/10.1016/j.jclepro.2021.127828
2. Dhiwar, K., & Bedarkar, M. (2024). Circular economy for fashion waste in the Indian fashion industry: Challenges and opportunities. *Fashion Practice*, 16(3), 344–372. https://doi.org/10.1080/17569370.2024.2393495
3. Ellen MacArthur Foundation. (2023). A new textiles economy: Redesigning fashion's future. *Ellen MacArthur Foundation.* https://ellenmacarthurfoundation.org/a-new-textiles-economy
4. Gazzola, P.; Pavione, E.; Hillebrand, R.; Vota, V.; Rosa, R. (2025). The Circular Economy and the Role of Technology in the Fashion Industry: A Comparison of Empirical Evidence. *Sustainability* 2025,17,3104. https://doi.org/10.3390/su17073104
5. H&M. (2024). Sustainability Progress Report 2024. H&M Group. https://hmgroup.com/wp-content/uploads/2025/03/HM-Group-Sustainability-progress-report-2024.pdf
6. Jain, T. (2023). Strategies to adopt circular economy practices in the fashion industry. *SSRG International Journal of Humanities and Social Science*, 10(1), 26–33. https://doi.org/10.14445/23942703/IJHSS-V10I1P105
7. Kumar, M. (2025). Sustainability in fashion through technology. Paper presented at the International Conference on Advances in Theory, Research and Practices in Management (Hybrid), GLS University, Ahmedabad, India. https://www.researchgate.net/publication/390306472_sustainability_in_fashion_through_technology
8. McKinsey & Company. (2024). The state of fashion 2024: Futureproofing supply chains. https://www.mckinsey.com/industries/retail/our-insights
9. Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1(4), 189–200. https://doi.org/10.1038/s43017-020-0039-9
10. NITI Aayog. (2023). Extended producer responsibility for textiles in India: Opportunities and challenges. *Government of India*. https://www.niti.gov.in
11. Shakya, A. (2016). Integrated waste minimization techniques in apparel design: A sustainable perspective (Doctoral synopsis, Dayalbagh Educational Institute [Deemed University], Agra, India).
12. Sutha, T. (2024). Sustainability issues in fast fashion clothing. *International Journal for Multidisciplinary Research* (IJFMR), 6(6). https://www.ijfmr.com/papers/2024/6/31840.pdf
13. United Nations Environment Programme. (2023). Sustainability and circularity in the textile value chain: Global outlook and Indian context. https://www.unep.org
14. Younus, M. (2025). The economics of a zero-waste fashion industry. *Strategic Data Management and Innovation*, 2(1), 116–137. https://doi.org/10.71292/sdmi.v2i01.15

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