Chapter 10
Smart Labels and Eco-Tracking Tools for Sustainable Fashion Consumption

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ABSTRACT

The integration of artificial intelligence into the fashion industry is reshaping the way consumers engage with sustainability. This chapter explores the role of smart labels and AI-enabled eco-tracking tools in promoting sustainable fashion consumption. By using smart labelling and eco-tracking technologies such as RFID, QR codes, NFC tags and provenance tracking into fashion products, brands can provide real-time access to product lifecycle data. Additionally, they can give information on ethical sourcing, and environmental impact metrics of their products. AI enhances these tools by providing personalized sustainability suggestions, usage analytics, and predictive maintenance or reuse suggestions. This approach helps in motivating consumers towards more conscious choices. Through a mix of theoretical exploration and real-world case studies, this chapter demonstrates how AI-powered intelligent systems not only increase transparency, but also drive behavior change. It helps bridge the gap between intention and action, and moves the fashion industry towards a more sustainable future.

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INTRODUCTION

In present times, fashion industry is one of the most unsustainable sectors. It is unsustainable in terms of environmental, social as well as economic aspects. Currently the industry faces growing pressure to adopt sustainability across its supply chain. A growing global population and rapidly changing consumer tastes are driving unsustainable production and consumption. Today's fashion cycles are short and production is high. Consumption is excessive and disposal is extremely frequent. To meet demand, natural resources are being used faster than they can renew. Water, petroleum-based fibers, toxic chemicals, and energy are consumed at harmful levels. This has already caused serious environmental damage and needs urgent attention. While the industry has started to adopt sustainability strategies, new technologies can offer stronger solutions. Smart labels and eco-tracking tools which are enhanced by AI can support this production and consumption shift. These technologies possess real promise for enabling more sustainable fashion consumption. Many fashion brands still lack a clear understanding of supply chain management. Even if they do, there is often a reluctance to adopt environmentally sound practices. To achieve sustainability goals, systems need to be updated. This needs collaboration, training, and the use of digital technology at every stage of production and consumption. The fashion sector faces multiple social and environmental challenges and these hurdles make sustainable fashion production and consumption particularly difficult. To increase accountability, brands need to improve not only their own transparency but they also need to help consumers make informed decisions. Fashion companies should evaluate what information is already available to various stakeholders and identify the knowledge gaps that still exist. While it is important to raise awareness and share information, it is just as vital to apply that knowledge internally. This approach can help build stronger sustainable initiatives and reduce negative impacts across the supply chain.

As the concerns related to sustainability are rising, fashion consumers are also becoming more environmentally conscious, and communication about sustainable consumption is also increasing. Organizations are taking initiatives to provide direction and clarity, and brands are experimenting with sustainable materials and innovations. Fashion brands are also rethinking supply chains where suppliers are working to improve production processes and product quality. However, this trend is not flourishing because the fashion industry is pretty large and complex. Current efforts are insufficient to ensure a truly viable supply chain and there is an urgent need for transparency and traceability of supply chains (Aakanksha & Aravendan, 2023). Implementing traceability systems in the fashion industry is a complex process, facing many technical, economic and social barriers. The materials used