
AI-Driven Communication Strategies for Material Innovation: Bridging the Gap Between Technical Textiles and Consumer Perception in Sustainable Fashion

Ana Cristina Broega

Textile Engineering Department, Center for Textile Science and Technology, Campus Azurem, Portugal

Catarina Costa

Textile Engineering Department, Center for Textile Science and Technology, Campus Azurem, Portugal

Abstract

The fashion industry is undergoing a profound transformation driven by the digital revolution and consumer demand for sustainable alternatives. Although biotechnology associated with next generation textile materials (such as biobased fibers and regenerated polymers) offers promising pathways, its technical complexity often creates a significant gap between innovation and consumer perception. Consequently, material sophistication frequently results in skepticism exacerbated by a lack of specialized knowledge. This paper investigates the role of Artificial Intelligence (AI) as a cognitive bridge between laboratory led innovation and market level understanding. Through a literature review and a case study of a brand at the vanguard of next generation materials, the research examines how emerging technologies translate complex technical data into accessible, transparent messaging. The focus lies on how these strategies educate consumers to better comprehend material advancements. Findings suggest that AI serves as a fundamental agent for fostering consumer literacy regarding technological progress. Ultimately, AI is the catalyst required for textile innovation to transcend its technical niche and gain traction within the circular market. It offers practical insights for managing fashion brands that strive to be simultaneously technologically driven and authentic in the era of Industry 4.0.

Index Terms

Artificial Intelligence; Technical Textiles; Sustainable Fashion; Consumer Perception; Circular Bioeconomy