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ECO-CIRCULAR DENIM: A SYSTEMATIC LITERATURE REVIEW ON THE ECO-SUTAINABLE AND CIRCULAR URBAN MODEL

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Abstract

The growing environmental and climate crises require a fundamental transformation of production, consumption and waste management systems. Textiles are a critical sector. Denim is one of the most widely used and resource-intensive fabrics. Its reliance on cotton, chemical-heavy finishing processes and substantial post-consumer waste exemplifies the challenges posed by fast fashion. This paper conducts a systematic literature review to explore the application of circular economy principles within the denim sector. The findings reveal four interconnected themes: Environmental impacts, which highlight the ecological burden of denim production and the potential benefits of fibre-to-fibre recycling; Supply chain and municipal roles, which emphasise the importance of local infrastructure and governance in facilitating textile recovery; Circular practices and consumer behaviour, which show the opportunities and challenges of bridging the gap between attitudes and behaviours regarding circular practices; Regulatory and policy frameworks, which underline the enabling role of European strategies such as the Green Deal, the Circular Economy Action Plan, the Eco-design for Sustainable Products Regulation and the Waste Framework Directive. Building on these insights, the paper introduces the Eco-Circular Denim model: a smart, municipality-centred framework integrating eco-design, digital traceability, consumer engagement and extended producer responsibility in post-consumer denim management. This positions the model as a strategic entry point for operationalising the circular economy in urban contexts, aligning local infrastructure with EU policy ambitions. By connecting technological innovation, behavioural changes and governance mechanisms, the study offers a comprehensive approach to reducing environmental impact, enhancing resource efficiency and promoting circular urban textile systems.

Key words: circular economy, denim waste management, digital technologies, regulatory frameworks, sustainable fashion, municipal governance

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