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Operationalizing Slow Design within Circular Textile System for Environmentally Responsible Textile

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ABSTRACT

The fashion sector globally, facilitated by the imitations of fast fashion that encourage the use and disposal of products that consume alarming amounts of resources and produce unnecessary textiles that contribute to the increasing rates of textile waste. Even though sustainable materials, recycling, and cleaner production have gained popularity, they seem to ignore the underlying ideologies that facilitate overconsumption. This paper will examine how slow design ideology, which leans on longevity, care, emotional longevity, and sustainable consumption, can be incorporated into sustainable textile reuse systems. Applying the qualitative design research approach, the current research incorporates the critical analysis of literature, case study, and development of the concept framework. The requirements of the philosophy of slow design are identified and aligned with circular textile strategies to assess the theory-practice gap between the philosophy and the process of implementation. On the basis of the analysis, an overall framework of design related to the philosophy of the slow-circular textile has been developed. The contribution of this research is that it presents a design level model that is not based on technology or marketing but provides designers, educators, or researchers with a means of developing textiles that are not only environmental but also have cultural significance.

Keywords: *slow design; circular textile systems; sustainable fashion; emotional durability; textile lifecycle design; design for longevity*

INTRODUCTION

Today, the textile and fashion industry is one of the World's most resource-hungry and ecologically destructive industries. Fast fashion's fast production cycles, chemical processing, large water usage, and increasing textile waste have led to a sustainability crisis in the industry. Fast fashion, with its fast production rate and low product lifespan, fosters a culture of overconsumption that results in immense ecological pressure due to land fill waste, micro plastics, and carbon emissions. Under these circumstances, sustainability in textile technology becomes neither an aspirational good nor a luxury; rather, it's a survival need for ecological and fashion industry sustenance itself. Islam, M. M., Yin, R., & West, A. (2025). A Brief Review of Mechanical Recycling of Textile Waste. *Textiles*, *5*(4), 41.

However, current research findings are steadily reaching a consensus that technological efficiency by itself has no solution to the crisis. Even cleaner production, recycle technologies, and material inventions are not sufficient if the design paradigm of fast, disposal fashion continues unabated. The challenge of transformability towards sustainability, therefore, calls for a paradigm shift in the entire lifecycle of textiles from design to use. But the current trends of most initiatives towards sustainability in the textile industry are still biased towards efficiency and materials rather than design philosophies, without which the issue of overconsumption remains untouched.

Recent ideas of slow design, circular economy, zero waste design, and natural material innovation have received considerable attention recently as promising alternatives for more responsible textile solutions. Contrary to the commonly practiced fast fashion approach, these ideas focus on the qualities of timelessness, attachment, material longevity, and closed-loop material flow. But in fact, the vast majority of existing research approaches these ideas separately. There is little understanding of the interlinkages between these ideas. Czrnhak, T., Schreiber, D., & Mazzotti, K. G. (2025). Uma Análise Compreensiva sobre Moda Circular em Pequenas Empresas. *Revista de Administração Contemporânea*, *29*, e240239.

Although interest in slow fashion and circular fashion continues to escalate, nonetheless, a considerable gap continues to exist in relation to empirical study about the applicability of slow design principles within a circular fashion context. As such, whereas slow design relates to concepts of care, longevity, and engaging with fashion in a meaningful manner, circular fashion relates to issues of material restoration and a focus on sustainability through recycling. Nevertheless, within current literature, it appears challenging to access any applicable design frameworks regarding translations of slow fashion principles into functionally feasible circular fashion concepts. This work is placed within this context. It examines the applicability of principles within slow fashion regarding sustainable fashion production through an application of principles within a circular fashion context.

Research Problem Statement

Despite the rising concern for sustainability in the textile and fashion sector, most of the existing solutions still have a highly fragmented and 'tech-focused' approach. Recycling, eco-materials, and cleaner production tend to be regarded as 'standalone solutions' in the fashion sector, when they should be a part of the entire design system. On the other hand, the 'slow design' trend is praised for stressing 'durability and attachment,' but it hardly ever turns into practical textile development approaches.

This means that there is an important gap between the philosophy of slow design and the philosophy of textile cycles. There is a lack of frameworks that illustrate how slow design principles such as longevity, repairability, material honesty, and emotional durability can be integrated into textile cycles. This is inhibiting the ability to apply sustainable textile systems because designers do not have tools that would allow them to integrate longevity, repairability, and emotional durability into textile cycles. This means that the industry relies on the surface level in sustainability strategies instead of the deep systems level.

Research Aim

Development and theoretical foundation of a design-led approach to combine slow design concepts within the context of circular textile systems to produce eco-responsible and durable textiles.

Research Objectives

1: To analyze and evaluate the effects of fast fashion on the environment and prevailing sustainability trends in the garment industry.

2: To critically analyze the theories of slow design and the circular economy in textile design contexts.

3: To explore gaps in slow design philosophy and current circular textile traditions.

4: To examine the application of slow design concepts such as longevity, care, and emotional durability within the circular economy framework for the textile industry.

5: Assessing the case study textile designs to understand the value of slow design that may or may not be associated with circular designs. 6: To formulate an integrated design framework for slow-circular textiles that promotes sustainability, reduces materials, and maximizes product life.

Research Questions

1. In what ways has fast fashion impacted the environment in the textile industry?

2: What roles do Slow Design and the principles of the circular economy currently play in sustainable textile innovation?

3: What gaps exist between slow design philosophy and implementing circular textiles?

4: How can principles of slow design be applied to create strategies in circular design in textiles?

5: How may a framework of slow-circulation be more environmentally responsible in textile systems?

RESEARCH METHODOLOGY

This Study follows a qualitative design-based research method to explore how the philosophy of slow design can be put into operation in a circular economy textile system. Design-based research is particularly suitable for the given study because it can explore the theoretical concepts and real world design practices together with a view to developing a practically and contextually sensitive framework. In the approach, theoretical inquiry, empirical case analysis, and the integration of framework development form one entity that enables the research to move beyond abstract sustainability discourses toward applied design solutions.

The literature reviews shall introduce the conceptual basis of the study: fast fashion, environmental impacts of textiles, slow design theory, circular economy, zero-waste design, and sustainable materials, through systematically analyzing peer-reviewed journals, books, and authoritative reports. It is in this critical review that the key concepts, debates, and gaps in existing knowledge are identified, particularly where slow design and circular economy are discussed separately rather than as an integrated system. The analysis of the case studies will concentrate on certain global and local fashion labels and textile companies that pretend to apply slow fashion and circular systems in their work. The case studies will be assessed in a very uniform manner with criteria such as material, longevity of the product, product repairability and modularity, user involvement, and product end-of-life management. Thus, the research will be able to determine to what extent fashion labels apply slow design in their circular systems.

In the process of comparative framework analysis, principles from slow design, such as emotional durability, take-in, or longevity, will be systematically aligned with strategies from the circular textile economy, such as recycle, re-use, or material recovery. Such an alignment would identify correspondences, contradictions, or lacunae in philosophy and practice.

Lastly, through design framework development, there will be an integration of information from the literature and case studies, culminating in an integrated slow-circular textile design framework. The framework will offer design principles for material choice, design for the life cycle of products, design for repair and reuse, and nurturing emotional and cultural values for textiles.

Expected Contribution

This is important research that contributes significantly to sustainable textile design by introducing a design-level framework that systematically integrates slow design philosophy with circular textile systems. The dominant sustainability models developed to date often relate either to material efficiency or to recycling technologies, whereas this work develops and advances a more holistic approach by embedding emotional durability, product longevity, and user-textile relationship into the circular production strategy. Such a framework will contribute to informing designers on how to create textiles which are not only recyclable but also valued, cared for, and used longer.

This thus provides educators and researchers with a new conceptual model, connecting theory and practice to more meaningful teaching and further research into sustainable textile design. Ultimately, this framework helps move the industry beyond surface-level green marketing toward genuinely regenerative, culturally meaningful, and environmentally responsible textile systems that reduce waste, extend the product life span, and promote sustainable consumption behaviors.

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