

# E-BOOK OF EXTENDED ABSTRACT

## THE 14<sup>TH</sup> INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025



14<sup>TH</sup> **INDES** 2025

ENVIRONMENTAL • SOCIAL • GOVERNANCE



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INVENTION, INNOVATION &  
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**Organized by:**

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# CLOSING THE LOOP: SERICLO'S SMART SYSTEM FOR FASHION SUSTAINABILITY

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## ABSTRACT

SERICLO is a website that aims to address the textile waste problem caused by the fast fashion phenomenon. It offers various features, such as textile recycling, a preloved clothing marketplace, donation options, and AI-based redesign features integrated with AR. The website enables users to contribute to environmental conservation and support the implementation of a circular economy in the fashion industry. By combining artificial intelligence and forming partnerships with the recycling sector, SERICLO provides a comprehensive solution to reduce clothing waste and promote sustainable fashion consumption.

**Keywords:** textile recycling, AI-based fashion, fast fashion, sustainable clothing, circular economy.

## 1. INTRODUCTION

### 1.1 Background

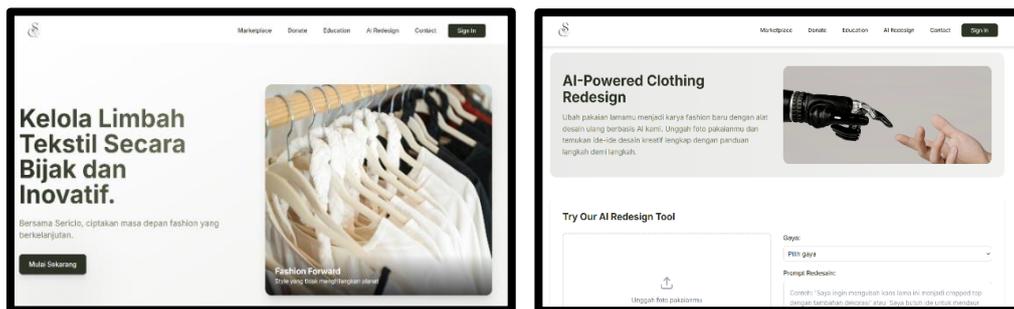
In the current era of globalization, where the exchange of information and culture between countries has become easier, there has been a significant shift in societal trends. Various emerging trends in society, whether in lifestyle, clothing, or other aspects, undeniably influence multiple industrial sectors, including the fashion industry. The rapid changes in fashion trends, both nationally and internationally, have compelled fashion industries worldwide to adapt to meet public demand and boost sales. This situation has led many fashion companies to compete in producing clothing quickly, at low prices, and in styles that reflect the latest trends, often without considering the long-term effects of such continuous and rapid changes. This phenomenon is known as fast fashion, a business model that emphasizes the production of affordable, trend-responsive clothing, enabling brands to quickly release new products regularly (Lukmanul Hakim & Rusadi, 2022).

The global fashion industry today is driven by the fast fashion trend, which negatively impacts the environment. Fashion production accounts for 10% of total global carbon emissions, equivalent to the emissions produced by the European Union. The industry also depletes water resources and pollutes rivers and streams, while 85% of all textiles are discarded in landfills yearly. In fact, washing clothes releases 500,000 tons of microfibers into the ocean annually, equivalent to 50 billion plastic bottles (Maiti, 2025). This situation is further exacerbated by household clothing waste, driven by people's consumptive behavior toward trends. According to data collected by the United Nations Climate Change, total greenhouse gas emissions from textile production reach 1.2 billion tons per year, which is more than the combined emissions from all international flights and maritime shipping. Some estimates suggest that emissions from this sector are expected to increase by more than 60 percent by 2030 (Fashion Industry, UN Pursue Climate Action for Sustainable Development, 2018).

## 1.2 Purpose of Innovation Products

SERICLO was developed in response to this problem. The platform offers a digital solution for textile waste management by providing an integrated system where users can recycle, redesign, donate, or resell unused clothing. SERICLO serves not only as a platform but also as a movement to raise awareness and encourage community participation in a sustainable fashion. This aligns with the growing public concern about environmental impact and opens up opportunities for innovation in textile circularity.

## 2. METHODOLOGY



SERICLO is a digital platform in the form of a website integrated with artificial intelligence (AI), offering an innovative solution to the waste problem caused by the fast fashion industry through its redesign, recycling, donation, and marketplace features. With AI technology, SERICLO enables users to redesign old clothes to make them trendy and marketable again, manage donations of wearable garments, and connect with recycling partners and sustainable fashion marketplaces. SERICLO's strength lies in its integration of circular processes within a single, smart system, making it easier for individuals and industries to contribute to environmentally friendly and responsible fashion.

### 2.1 Main Functions

SERICLO is an innovative website that serves as a platform for communities and industries to manage textile waste wisely. The website offers various key features, such as recycling unusable clothes into new, valuable products; a marketplace to resell preloved clothes; a clothing donation system in collaboration with social organizations; and an artificial intelligence-based redesign feature that allows users to make old clothes more fashionable and environmentally friendly, thereby supporting waste reduction and curbing fast fashion consumption.

### 2.2 Product Advantages

SERICLO utilizes technology to support textile waste treatment activities, reaching areas that lack adequate treatment facilities. Compared to other websites, SERICLO offers more features, such as recycling, buying and selling preloved clothes, and redesigning garments using AI and Augmented Reality technology. These technologies provide a visual display within the redesign feature, enhancing customer experience and offering innovative user interaction. The website also promotes a circular economy through partnerships with MSMEs and recycling factories, and it is designed with a user-friendly interface.

### 2.3 Technology and Manufacturing Method

SERICLO is built using Next.js for front-end development and Express.js for the back-end. Supabase is the main database that stores information on users, products, transactions, and recycling. To support

its AI features, SERICLO utilizes OpenAI GPT-4.0 mini. The website integrates modern technologies such as Artificial Intelligence (AI) to enable intelligent and sustainable clothing redesign features. The development process included creating a website description, feature list, database schema, UI mockup, and source code implementation, all tested through functionality, performance, and usability testing to ensure system quality. After the refinement stage, SERICLO is ready to offer an optimal user experience and align with sustainable digital technology standards.

### **3. FINDINGS**

#### **3.1 Competitor Analysis**

As a website focusing on textile waste treatment, SERICLO has several competitors, such as Waste4Change, RE.UNIQLO and Zero Waste Indonesia adopt different approaches to addressing sustainability issues. Waste4Change focuses on general waste management, operates in the B2B sector, and does not explicitly address textile waste or provide a platform for individual consumers to manage their used clothing. RE.UNIQLO, on the other hand, concentrates on recycling garments from its brand through internal programs limited to the UNIQLO ecosystem. Meanwhile, Zero Waste Indonesia emphasizes education and sustainable lifestyle changes, for instance, through the “Tukar Baju” campaign, but does not offer an interactive digital platform for waste management.

Among these competitors, none provides a single platform that comprehensively addresses textile waste management. In contrast, SERICLO offers a more complete, inclusive, and integrated approach, featuring recycling, a marketplace, donation services, and AI- and AR-based clothing redesign tools. These features are accessible to a broad audience, making SERICLO an innovative solution combining technology and sustainability within one cohesive ecosystem. SERICLO helps people address textile waste issues resulting from the fast fashion phenomenon, targeting both the B2C sector and expanding through collaborations with partners in the B2B sector.

#### **3.2 Stages of Product Development**

##### **i) Research and development stages**

The product research stage began with understanding and analyzing society's current problems, particularly textile waste resulting from the fast fashion phenomenon. This was followed by researching customer behavior, identifying recycling opportunities, and exploring emerging sustainable fashion trends. A competitor analysis was also conducted to understand the users' needs better. As a result, SERICLO developed a range of features to address these issues. The features include recycling, donation, resale, and clothing redesign, supported by the integration of AI (Artificial Intelligence) and AR (Augmented Reality) technologies for future enhancements.

##### **ii) Prototype or initial model**

The analysis of customer needs generated ideas that supported the initial prototyping stage of the SERICLO website. The website interface and user flow were designed directly using web-based development tools to ensure clarity and ease of use. The product flow was illustrated during the prototyping stage, beginning with the user's access to the main features such as recycling, marketplace, donation, and redesign. This prototype was then tested with several potential users to gather direct feedback before moving on to the system development phase.

### iii) Product testing and validation

After the initial version of the app was created, product testing was conducted to ensure that all features functioned as intended. This testing involved potential users from various backgrounds, including individuals, creative communities, and industry partners, to assess whether SERICLO effectively meets their needs. During this stage, a range of user feedback was collected, covering aspects such as user comfort, potential obstacles encountered, and the overall ease of navigating and using the website's various features. The feedback gathered will be utilized for further product development, ensuring the platform is refined and ready for wider launch.

### 3.3 Product Marketing Plan

Product marketing activities are carried out through social media promotions, starting with content preparation and advertising strategies, creating engaging content, and aligning with SERICLO's vision and mission. These include voicing sustainability lifestyles and the dangers of fast fashion. In addition, marketing campaigns are also carried out through Google Ads, Facebook Ads, Instagram Ads, and other promotional media. Direct promotional activities are also carried out through organizing educational seminars and webinars to provide helpful information related to the importance of responsible fashion consumption and the negative impact of fast fashion trends on the environment, as well as introducing SERICLO as an innovative and solutive website in dealing with problems faced by society related to textile waste.

### 3.4 Environmental Impact

SERICLO has a positive impact on the environment, namely reducing the volume of textile waste in landfills, preventing the accumulation of untreated textile waste, reducing water and soil pollution due to chemicals such as polyester contained in clothing materials often used by the fashion industry, helping to reduce carbon emissions from the production of new clothing, encouraging a circular economy in the fashion industry by extending the life cycle of clothing, helping to increase public environmental awareness, and assisting people to take responsibility for their textile waste.

## 4. CONCLUSION

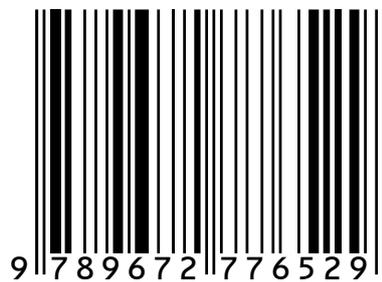
The ever-increasing problem of textile waste is one of the serious challenges in the effort to preserve the environment. In the era of fast fashion and excessive consumption patterns, people tend to exacerbate the amount of textile waste in various regions. For this reason, SERICLO is an innovative digital-based solution that provides multiple functional services such as recycling, resale, donation, and clothing redesign. It also encourages efforts to raise awareness of the importance of sustainable fashion practices. Through the utilization of Artificial Intelligence and Augmented Reality technology, as well as strategic partnerships with recycling industry players, SERICLO is expected to be an initiator in encouraging the transformation of the fashion industry towards a more environmentally friendly, responsible, and long-term sustainability-oriented direction.

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