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DESIGN STRATEGY FOR SUSTAINABLE APPAREL PRODUCTION

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Fashion is considered the second most destructive industry to the environment [1], with many concerns triggered in the fashion supply chain and consumption. Sustainable apparel creation not only helps reduce the environmental impact of fashion but also meets the growing demand for eco-friendly products among increasingly conscious consumers [2].

Textile sources must be kept in a loop as much as possible while maintaining their value for a circular economy [3].

Zero-waste design is a concept that aims to eliminate or minimise fabric waste during the garment creation process. In traditional fashion designing, inefficient pattern cutting and garment construction methods result in a significant amount of fabric being discarded.

In this research, a sustainable design model is described to reduce manufacturing waste. Based on the model developed in our study, all textile products will be expected to stay in the loop by utilising new products. The textile waste from the cutting room, approximately 15-30 % of the fabric, gets discarded; therefore, practical use and utilisation are crucial challenges in sustainability [1].

In this research, a sustainable design model is described to reduce manufacturing waste. Based on the model developed in our study, textile products will be expected to stay in the loop by recycling new products.

The conceptual scheme of recycling textile waste from the sewing industry is in Fig. 1. In the first step, the raw composition of textile waste from the garment industry and the possibility of their collection is investigated. For work on further steps, there are difficulties in organising actions with waste sorting, the choice of recycling technologies and their pre-treatment.

Textiles must enter the market of the light industry of Ukraine, the raw material composition of which does not correspond to the design specified in the product passport; therefore, it is needed to establish the process of internal certification of textile materials to clearly define their content, purity of raw materials and reduce restrictions on their use for the process fibre processing.

The study and implementation of technological innovations are urgently needed to fully perform the closed cycle of recycling textile waste from the garment industry and sustainable apparel production in Ukraine.

The choice of textile processing is in the third step. The types of recycling technologies differ in several parameters: how they affect textile waste, energy efficiency, and the ability to restore or preserve the original quality. The most straightforward type of technology is mechanical. This processing uses physical forces such as cutting and grinding to convert textiles into usable fibres. It is a commercially proven, low-energy and cost-effective recycling method. All threads can be recycled according to the principle "what goes in, comes out", meaning that the raw material composition of textile waste will become the raw material

composition of the processed fibre. In mechanical processing, there are “open cycle” (downcycling) and “closed cycle” [3]. The other types of technology require more specific technical conditions associated with high requirements for raw materials (more than 99% homogeneous or compatible polymers), which limits their availability.



Fig. 1. Conceptual scheme of recycling textile waste

Today, clothing recycling and upcycling are embraced as an ideology for many brands and initiatives. Upcycling requires fair certification, modern recycling technology and the enterpriser's motivation. This research is of value because it draws a model specifically targeting textile waste and sets a foundation for recycling it.

References

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