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Waste Management towards Sustainable Fashion

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Abstract

This paper explores waste management in the textile industry towards achieving sustainable fashion. It addresses the industry's environmental impact, challenges of waste generation, and the positive consumer shift towards eco-friendly products. Case studies of brands like Patagonia and Nike highlight recycling efforts. Effective waste management can reduce costs and environmental impacts while promoting circularity in fashion. By implementing effective waste management strategies, the fashion industry can reduce costs, minimize environmental impacts, and contribute to a more circular and resource-efficient model of production.

Keywords: Waste management; Textile industry; Environmental impact; Brand case studies; Sustainable fashion

Introduction

The fashion and textile industry has garnered significant criticism due to its adverse environmental impact, which encompasses issues such as waste generation, resource consumption and carbon footprint, all of which are present throughout the supply chain operations [1]. The manufacturing of textiles and apparel is known to consume considerable amounts of energy, water and other natural resources, leading to the rapid generation of substantial waste [2,3]. In response to the challenges faced by the textile and apparel business, there has been a growing focus on sustainable practices to mitigate the climate crisis and reduce the industry's environmental burden [4]. The combination of increasing demand from fashion-conscious consumers and the rise of fast fashion has resulted in a significant surge in apparel production and consumption [5], which, in turn, contributes to a substantial volume of waste at various stages of manufacturing, including spinning, knitting/weaving, dyeing, apparel making, and finishing [6]. According to several studies, it has been estimated that the global textiles industry produced around 92 million tons of waste in 2014. Unfortunately, only a small portion of this waste is reused or recycled, while a significant amount finds its way into landfills or is incinerated [7]. This has been noticed that maximum focus is always given to water & energy in textile industry rather than the solid waste management and make it a vital problem for textile industry [3].

In 2015, the textile and apparel industry held a substantial value of USD 1.3 trillion. Throughout that year, approximately 53 million tons of textile fiber were consumed, with a staggering 73% of it ending up in landfills or being incinerated. Regrettably, less than 1% of the material was recycled for the production of new clothing, resulting in a loss of over USD 100 billion worth of materials annually [8]. Various types of waste generated in textile industry during production has been depicted in Table 1.

Table 1: Various types of waste generated in textile industry during production.

Waste Type	Description
Fibre Waste	Waste generated during the processing and production of fibres used in textiles and apparel. This includes trimming waste, short fibres, and by-products.
Yarn Waste	Waste generated during the spinning and twisting processes of yarn production. This includes broken or unusable yarns, leftover yarn ends, and manufacturing defects.
Fabric Waste	Waste generated during the cutting and sewing processes of fabric production. This includes fabric scraps, offcuts, and rejected or flawed fabric pieces.
Apparel Waste	Waste generated during the manufacturing of apparel, such as garments that do not meet quality standards, samples, prototypes, and damaged or unsold products.

These types of waste represent the various stages of textiles and apparel manufacturing where waste is generated, highlighting the need for effective waste management and recycling practices to reduce the environmental impact of the industry.

Impact of waste in industry and environment

The textile industry faces significant challenges related to the generation and management of waste throughout its manufacturing processes. These problems have far-reaching implications for both industry and the environment.

Here are the key issues associated with improper waste management in the textile industry as described below:

A. Increased production costs due to the disposal of valuable raw materials as waste.

B. Wasteful handling and resource consumption during waste management.

C. Energy loss associated with transportation, disposal, and management of waste.

D. Potential legal, environmental and social issues arising from improper waste management.

E. Water pollution from untreated wastewater discharge, harming aquatic ecosystems.

F. Air pollution caused by gaseous waste and cotton dust, contributing to health hazards and climate change.

G. Noise pollution from textile manufacturing activities affecting worker and community well-being.

Addressing these problems requires implementing effective waste management strategies in the textile industry. By maximizing resource reuse, improving wastewater treatment, reducing air emissions, and promoting recycling practices, industry can mitigate the environmental impact of solid waste while also improving its operational efficiency and sustainability.

Shift towards sustainability

Consumer awareness has played a significant role in driving the demand for greener products in recent years. The advertising and marketing strategies employed by companies have also shifted towards promoting eco-friendliness [9]. There is a growing acceptance and positive mindset among consumers towards purchasing recycled textile materials that are both eco-friendly and safe for the skin, as indicated by a recent study. Eco-spun (Welspun Inc.) is a brand that specializes in selling recycled fabrics made from discarded plastic bottles with approximately 9 million plastic-based wastes being disposed of in landfills each year. It was found that just 200 PET bottles are sufficient to cover a standard-sized sofa [10]. The renowned fashion brand, Patagonia, has pioneered methods for recycling old PET bottles, resulting in the creation of recycled fibers. These sustainable fibers have been incorporated into clothing lines of Armani Jeans, Eco-simple, and Marks and Spencer, further promoting the use of recycled materials in the fashion industry. K-sorb, a company under Eco-sorb International, specializes in manufacturing regenerated textiles used in industries, sludge stabilization and environmental remediation programs. Barnhardt, a long-standing recycling company, supplies homogenous blends of regenerated, reclaimed, and recycled cotton. Nike has taken various sustainability initiatives, including reducing shoe box sizes, monitoring effluent discharge, recycling cloth hangers, collecting excess clothing, and recycling yarns for new apparel and footwear. These efforts demonstrate their commitment to waste reduction and environmental responsibility.

Conclusion

Waste management plays a crucial role in achieving sustainable fashion. The textile industry faces significant challenges related to waste generation, including the disposal of valuable raw materials and environmental pollution. Efforts such as recycling PET bottles, utilizing regenerated textiles, and implementing efficient waste management strategies are transforming the industry. By embracing sustainable practices, the fashion industry can minimize production costs, reduce environmental impacts, and improve operational efficiency. However, further advancements are necessary to address the scale of waste generated by industry. Collaboration among stakeholders, including manufacturers, retailers and consumers is vital for driving change and creating a more sustainable fashion ecosystem. In the pursuit of sustainable fashion, waste management must be prioritized as a key element. It is not only an opportunity to reduce the environmental burden but also a pathway towards a more circular and resource-efficient industry. By embracing innovative solutions and fostering a culture of sustainability, the fashion industry can contribute to a greener future while satisfying consumer demand for eco-friendly products.

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