

# Clothing and Textile Design as a Sustainable Dimension in Modern Fashion Industry

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## Abstract

## Original Research Article

The trend of modern fashion industry specifically is increasingly confronted with certain challenges like environmental, social and economic sustainability challenges. This has placed the industry in a dilemma. Clothing and textile design as aspects of Applied Art have emerged as a body of critical dimensions in addressing these issues by integrating sustainable principles into media in art. This can simply take place in the areas of selection, production processes and consumption patterns. This research paper critically examines how sustainable clothing and textile design can meaningfully contribute to the act of transforming the fashion industry toward responsible production and consumption in our society without considering the challenges at hand. It is therefore, explores eco-friendly materials, circular design models, ethical practices and technological innovations as a means of the body of supporting tissues that will meaningfully enhance sustainability. The study therefore, reviews the available literature and documents and reports same. Its conclusion was drawn with relevant suggestions among which says that sustainable textile design should be taken as an essential tool for mitigating against the negative impacts of fast fashion and ensuring long-term viability of the fashion industry.

**Keywords:** Sustainable fashion, textile design, eco-design, circular economy, ethical production.

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## 1. Introduction

The present fashion industries of today are one among the most dynamic global sectors that basically deal with human consumption in terms of clothing and endo-protective measures against health hazard. Yet, such industries are also among the most environmentally damaging due to the excessive resources negative consumption, pollution and waste generation (Henninger, Alevizou, Oates, 2016). The rise of fast fashion has intensified these challenges by promoting rapid production cycles and disposable clothing in our society. In response to this situation,

clothing and textile design have become central of focus to sustainability efforts within the other industries. Designers now play a pivotal role in shaping environmentally responsible practices through material innovation, production efficiency, and lifecycle thinking (Niinimäki, 2020).

This has made the global fashion industries to undergo significant transformation over the past few years with an involvement in one of the most dynamic and influential sectors of the modern economy. However, this rapid growth and development has been accomplished with serious

environmental, social and economic challenges which tends to include excessive waste generation, resources depletion, pollution and unethical labour practices (Niinimäki, et al 2020). In view of these concerns, the concept of sustainability has emerged as a critical framework for rethinking the production, consumption and lifecycle of fashion practice and production.

Within this basic context of human thinking, clothing and textile design plays a pivotal role, duty and responsibility as a sustainable dimension in the modern industry. As a core component of fashion production, textile design influences materials selection, production techniques and styles of practice and production in the areas of longevity and end-use application. Sustainable clothing and textile design emphasizes the use of eco-friendly fibers, innovative recycling, methodology, reduction in energy consumption and integrations of traditional and indigenous knowledge system. These approaches aim not to only minimize environmental impacts but to also promote cultural preservation our heritage and ethical practices.

Therefore, positioning of clothing and textile design as a sustainable dimension in the modern fashion industries in not only timely but necessary. It highlight the potential of design as a transformative tools capable of reshaping industry practices, influencing consumer behavior and contributing to a more sustainable and equitable global fashion system as a whole in our society.

## 2. Concept of Sustainability in Fashion and Textile Design

Sustainability as a concept of practice in art has a space in in clothing and textile design which simply refers to the state of integrating environmental, social and economic considerations into the design and production of fashion products that are basically eco-friendly in our society. In view of this, the concept of sustainability in fashion and textile design tends to challenge the traditional *fast fashion* model by promoting practice that can reduce negative impacts on the planet and improve the well-being of people involved in the fashion value chain. At its core level of understanding, sustainability in fashion tends to

integrate three basic dimensions in fashion industries: Environmental sustainability, social sustainability and economic sustainability

### 2.1 Environmental Sustainability

This type of integration basically involves the act of minimizing harm to natural ecosystems. This involves reducing: Water consumption Carbon emissions, Chemical pollution and Textile waste

Textile design productions are of the most resource-intensive industries, involving large amount of water, energy and chemicals (Sulaiman, 2024). Sustainability fashion tends to encourage the use of eco-friendly materials such as organic cotton, hemp, bamboo and recycled fibers. It also promotes low-impact dyeing techniques, waste reduction and management

### 2.2 Social Sustainability

In this aspect of sustainability, emphasis is laid on ethical labour practices and fair treatment of workers. Many conventional fashion supply chains that involves poor working condition, low wages and exploitation. Sustainability textile design tends to advocate for fair trade, safe working environment and respect for human right and dignity. It also tend to value traditional craftsmanship and indigenous textile knowledge, skills and practices for the sake of cultural contributions.

### Economic Sustainability

This basically involves the act of creating systematic approaches that are financially viable without compromising environment and social standard. This includes support for slow fashion where equality, durability and timeless design are prioritize over mass production and rapid consumption. It also encourages responsible consumer behavior such as buying less, choosing quality over quantity and supporting sustainable brands.

The overall sustainability in fashion and textile design represents a shift towards a more conscious and responsible industry. I mean the industry that

balance creativity with environmental stewardship and social responsibility that ensures future generations that will meet their own needs without any form of compromise. Finally, it ensures long-

term profitability while maintaining responsible production practices. These three pillars collectively define sustainable fashion design.



Fig. i: Clothing production of fashion and textile design illustrating the three cogent sustainability of environmental, social and economic. Adapted from: Understanding the Position of Effective Thinking in the Phase of Creativity. Author: Sulaiman D.I. (2024). Publisher: EXISWAC Academic Research and Educational Consultancy Services Publisher. Year of adaptation: 2026.

### 3. Role of Clothing and Textile Design in the Act of Sustainability

Within the framework of sustainable industrial growth and development, clothing and textile design is not a mere decorative or utilitarian endeavour,

rather, it functions as a critical agent in militating against environmental degradation, promoting social equity and reconfiguring consumption paradigms in the contemporary era of fashion system in the following areas:

- Technological integration and future prospective understanding in favour of rapid growth and development
- Ecological understanding of responsibility of materials and their involvement in innovation, exploration and experimentation.
- Ethical means of production in line with social sustainability
- Waste reduction techniques of lifecycle design means of effective thinking in both logical and lateral
- Cultural integration of the basic ideas of sustainability and preservation of indigenous of knowledge, skills and practice among others.

### 3.1 Sustainable Material Selection

This simply refers to the act of choosing the actual raw materials for the processes of fashion production that will minimize environmental harm, support social responsibility and encourages perfect lifecycle. Based on the choice, the following are the sustainable materials selection:

- Environment impact of materials against low water and energy consumption.

- The choice of renewability in terms of resources efficiency based on plant and animal based fibers.
- The effective possibility and biodegradability of major focus on weather.
- Understanding the durability and longevity of fabrics will help to combat the waste associated with fast fashion by extending product life cycle.

### 3.2 Eco-Design and Lifecycle Thinking

This is also called design for sustainability. This is the basic practice of producing clothing with minimal environmental impact right from the stage of fabrics selection to the design stage. This is normally effectively carried out based on the following factors:

- Sustainable selection of the needed fabrics
- Low impact on production processes
- The basic ideas and implementation of waste minimization
- Technique of designing for durability and disassembly



Fig. ii: Eco-Design Clothing production of fashion and textile design illustrating the three cogent sustainability of environmental, social and economic based on lifecycle means of thinking. Adapted from: Understanding the Position of Effective Thinking in the Phase of Creativity. Author: Sulaiman D.I. (2024). Publisher: EXISWAC Academic Research and Educational Consultancy Services Publisher. Year of adaptation: 2026.

In the phase of lifecycle thinking, it has to do with the simple means of considering the entire life of a garment, from raw materials extraction to the final disposal. In order to be effectively conducted, the following steps are expected to be taken:

- Raw material extraction
- Textile production
- Garment manufacturing
- Distribution and retail
- Uses of the phases of consumer stages
- Consideration of the end-of-life disposal and reuse (Sulaiman, 2024).

In view of the above, eco-design randomly involves the act of considering the entire lifecycle of a garment right from the selection of raw material and its extraction to the point of disposal. Lifecycle

assessment tools help designers to evaluate its environmental impacts at each of the involved stages (Gwilt, 2014).

### 3.3 Circular Fashion Systems

This is a Circular design model in fashion industry that is aimed to eliminate waste through the simple act of promoting the following processes:

- Reuse
- Recycling
- Up cycling

This approach contrasts the traditional linear model of production that involves a lot of wastage. This is because, in circular fashion system, the fabrics

remain in use for as long as possible based on the three basic processes mentioned above.

The following are the basic principles of circular fashion systems:

1. Design for longevity,
2. Design for reuse and recycling,
3. Waste as a resource for further creativities,
4. 4. Closed loop production and sustainable consumption models for renting clothes instead of buying (Niinimäki, Peters, Dahlbo, Perry, Rissanen and Gwilt, 2020).

#### 4. Technological Innovations that Support Sustainability

The world of technological advancements tend to enhance sustainable textile design industry which often used to transform materials production in aid of garments design and products consumption and reuse. (Henninger, Alevizou and Oates, 2016). These innovations have helped to reduce environmental negative impacts and improve efficiency and align with the industrial principles of Circular Economy and Sustainable Development through the following strategies:

- Waterless dyeing technologies
- Digital textile printing
- Smart textiles with extended lifespan
- Recycling and fiber regeneration systems

These innovations are often used to improve efficiency and reduce environmental negative impact in the society (Muthu, 2019).

#### 5. Consumer Behavior and Sustainable Fashion Production

Consumer awareness often plays a crucial role in the act of promoting sustainable fashion in our society. The act of increasing in demand for eco-friendly fashion and textile design products has drastically encouraged brands to adopt sustainable practices in this era of technological advancements (Black, 2012).

However, challenges such as overconsumption, lack of awareness and price sensitivity continue to hinder progress in the production, distribution and uses of such products (Clark, 2008). Such challenges that

hinder the act of achieving sustainable fashion, clothing and textile design, include the following without any means of hiding any fact and finding:

- High cost of sustainable materials
- Limited infrastructure for recycling
- Green washing by fashion brands
- Lack of global regulatory standards
- Fast fashion culture

Addressing these challenges requires collaboration among stakeholders, including designers, manufacturers, policymakers, and consumers (Muthu, et al 2019).

#### 6. Opportunities and Future Directions in Clothing and Textile Design for Sustainable Growth and Development

The future of sustainable clothing and textile design lies rightly in the society based on the following facts and findings:

- Development of innovative eco-materials by the society (the researchers)
- Expansion of circular economy models by the society
- Integration of artificial intelligence in design
- Strengthening policy frameworks
- Increased collaboration between traditional artisans and modern designers by the government (Fletcher, 2014).

These opportunities can drive the transformation of the fashion industry to the highest level of recognition in aid of rapid growth and development.

#### 7. Conclusion

Clothing and textile design serve as a sustainable dimension for the modern fashion industry through the processes of integrating eco-friendly materials, innovative design strategies, and ethical production practices. While challenges persist, the adoption of sustainable approaches offers a viable pathway toward reducing the environmental and social impacts of fashion. A collective effort from all stakeholders is essential to achieve a truly sustainable fashion industry.

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