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TEXTILE WASTE AS A CREATIVE AND TECHNOLOGICAL RESOURCE IN CONTEMPORARY CAPSULE FASHION DESIGN

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This study explores textile waste as a primary creative and technological resource within contemporary capsule fashion design. By integrating unified constructive bases for zero-waste cutting with a hierarchical upcycling system, the research transforms production scraps into complex artistic imagery. A seven-piece collection demonstrates this methodology, converting macro-scraps into patchwork, medium fragments into modular motifs, and micro-waste into biomimetic textures. The approach achieves a 98% material utilization rate, proving that waste-based engineering enriches modern aesthetics through modularity and innovative surface ornamentation.

Key words: *circular fashion, zero-waste design, upcycling hierarchy, textile waste integration, capsule collection, patchwork, modular appliqué.*

INTRODUCTION

The fashion industry is one of the most resource-intensive sectors of the global economy and generates significant amounts of textile waste. Rapid production cycles and the expansion of fast fashion have considerably increased global textile waste, which is estimated at approximately 92 million tonnes annually, much of it ending up in landfills or incinerators [1][2].

A substantial part of this waste is produced during garment manufacturing. During the cutting and production stages, about 15–20% of textile materials become waste, mainly in the form of fabric offcuts and unused remnants [3][4]. These materials are defined as *pre-consumer textile waste*, since they are generated before the product reaches the consumer.

Recent research highlights that textile waste can be reconsidered as a valuable material resource rather than industrial residue. Through innovative design strategies and recycling technologies, textile remnants can be reintegrated into the production cycle, supporting the principles of the circular economy and sustainable fashion development [5].

In contemporary fashion design, textile waste can also serve as a creative resource. Techniques such as patchwork, appliqué, quilting and textile collage enable designers to transform fabric remnants into new aesthetic compositions [6]. Within this context, capsule fashion collections provide an effective framework for integrating textile waste into versatile and sustainable garment design.



PURPOSE

The purpose of this research is to explore textile waste as a creative and technological resource in the conceptual development of a contemporary capsule fashion collection.

RESULTS AND DISCUSSION

The developed capsule collection demonstrates a synthesis of classic tailoring and experimental eco-design. Key results include:

– **Technological Resource Integration:** The use of **unified T-shape constructive blocks** for tunic-style garments ensured a minimized environmental footprint at the primary cutting stage, establishing a base for further creative manipulation.

– **Artistic Imagery through Upcycling:** Textile fragments were re-imagined as decorative elements based on their scale. **Macro-fragments** formed the geometric structure of **patchwork yokes**; **medium-sized scraps** were transformed into **stylized modular appliqués** (lion-head motifs); **micro-waste** and loose fibers were used to create **biomimetic textures** (moss-like fringe) on the jacket (tab.1).

Stylistic Concept: The collection proves that waste-based design does not limit artistic expression but rather enriches it, creating a "living" texture and complex surface ornamentation. The **detachable nature** of the artistic elements aligns with contemporary trends of modularity and customization in fashion.

Table 1

Integrated Matrix of Constructive Bases and Waste Utilization

Garment Item	Constructive Base	Recycling Technology	Artistic Effect
Classic Straight Skirt	Basic block	-	-
Flared Trousers	Modified flared block	Detachable modular appliqué	Modular Symbolic Ornamentation
Patchwork Cropped Top	Strapped cami block	Macro-fragment patchwork	Geometric Mosaic
Tunic Dress	Unified T-shape block	Patchwork yoke integration	Geometric Mosaic
Tunic Blouse	Unified T-shape block	Waste-based belt & patchwork	Geometric Mosaic
Tailored Jacket	Classic notched-lapel	Asymmetrical fiber manipulation	Nature-inspired Texture
Asymmetrical Vest	Lengthened-front block	Stylized upcycled motif (lion-head)	Symbolic Motif

Patchwork and textile appliqué effectively use small fabric remnants, integrating them into garments while ensuring aesthetic coherence and material efficiency [6].



Capsule Collection Combination and Styling Matrix (tab. 2)

Within the conceptual capsule collection, the garments follow the principles of versatility and modularity (fig. 1). Some pieces include detachable decorative elements that allow multiple styling options. The jacket and trousers feature removable appliqué details, while the tunic-style blouse and dress can be worn independently or styled with a patchwork belt. The dress can also be worn as a tunic combined with trousers (fig.2).

Table 2

Styling and combination matrix of the capsule collection

Garment	Jacket	Trousers	Skirt	Top	Tunic Blouse	Tunic Dress
Jacket	—	Coordinated set; appliqués removable	Elegant layered set	Layered styling	Layered styling	Outerwear layer
Trousers	Coordinated set; appliqués removable	—	—	Basic combination	Casual layered styling	Dress worn as tunic
Skirt	Structured outfit	—	—	Classic feminine set	Soft layered styling	Layered composition
Top	Base layer under jacket	With trousers	With skirt	—	Complementary layering	—
Tunic Blouse	With jacket	Casual outfit	Feminine set	Layered styling	—	Coordinated styling
Tunic Dress	With jacket	Tunic over trousers	—	—	Coordinated styling	—



Fig. 1. Artistic sketches of the capsule collection



Fig. 2. Stylistic layering and garment combinatorics: tunic dress with flared trousers



CONCLUSIONS

The study confirms that textile waste is a high-value resource capable of redefining contemporary fashion stylistics. By categorizing waste into a **three-level hierarchy**, the project successfully transitions from linear manufacturing to a **circular design model**. The use of **unified constructive blocks** combined with **biomimetic fiber manipulation** and **modular appliqués** demonstrates that technological responsibility can enhance artistic expression. This integrated methodology offers a scalable solution for the fashion industry, balancing high-end aesthetic standards with a near-zero waste environmental footprint.

REFERENCES

1. Unsustainable fashion and textiles in focus for International Day of Zero Waste 2025. *UNEP*. URL: <https://www.unep.org/news-and-stories/press-release/unsustainable-fashion-and-textiles-focus-international-day-zero> (accessed: 11.03.2026).
2. Sustainable Fashion. *Apex Fashion Lab*. URL: <https://www.apexfashionlab.com/glossary/sustainable-fashion> (accessed: 11.03.2026).
3. Fashion Industry Waste Statistics. *Gitnux*. URL: <https://gitnux.org/fashion-industry-waste-statistics/> (accessed: 11.03.2026).
4. Fabric Waste for a Greener Fashion World. *Fibre2Fashion*. URL: <https://www.fibre2fashion.com/industry-article/9815/solving-fabric-waste-for-a-greener-fashion-world> (accessed: 11.03.2026).
5. Fashion: Overview. *Ellen MacArthur Foundation*. URL: <https://www.ellenmacarthurfoundation.org/topics/fashion/overview> (accessed: 11.03.2026).
6. Aisiyiah W., Soewardikoen D., Azhar H. Innovation in Patchwork Waste. *Art Design and Society Research*. 2023. URL: <https://adshr.org/index.php/vo/article/view/307> (accessed: 11.03.2026).

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ТЕКСТИЛЬНІ ВІДХОДИ ЯК КРЕАТИВНИЙ ТА ТЕХНОЛОГІЧНИЙ РЕСУРС У СУЧАСНОМУ КАПСУЛЬНОМУ ДИЗАЙНІ МОДИ

В цій роботі досліджено текстильні відходи як основний креативний та технологічний ресурс у сучасному дизайні капсульної моди. Інтегруючи уніфіковані конструктивні основи для безвідходного крою з ієрархічною системою апсайклінгу, результати дослідження дозволяють перетворити виробничі обрізки на складні художні образи. Колекція з семи предметів демонструє цю методологію, перетворюючи макрообрізки на печворк, середні фрагменти на модульні мотиви, а мікровідходи на біоміметичні текстури. Цей підхід досягає 98% коефіцієнта використання матеріалу, що доводить, що інженерія на основі відходів збагачує сучасну естетику завдяки модульності та інноваційному орнаментуванню поверхні.

Ключові слова: циркулярна мода, безвідходний дизайн, ієрархія апсайклінгу, інтеграція текстильних відходів, капсульна колекція, печворк, модульна аплікація.