

Transformation of Textile Materials: Artistic, Functional Applications in Interior Space

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Abstract

Sustainability refers to reducing the aspects of the negative impacts of changing climate and environmental conditions on economic and social life leaving behind a world that is livable for future generations. In textiles, sustainability is maintaining production through certain methods -including utilizing natural raw materials, recycling and upcycling-, producing durable products, and reducing waste materials. Within this context, the sustainability of textile products used in various areas of interior architecture for artistic and structural functions is significant. The purpose of this study is to analyze the conditions under which textile waste can re-enter the life cycle, as well as the effects of using the recycled and upcycled materials in interior spaces. The study focused on the artistic and functional use of new products in interior spaces. Qualitative research methods including on-site observation, photographic documentation, interviews, and document analysis are used in the study. The research

evaluates the use of recycled and upcycled textiles in interior spaces, presenting examples of reintroducing waste into life through sustainable approaches. In the examples examined under the categories of artistic and functional works, similarities were observed in the materials and methods and also notable differences were found in the production techniques of the designs created from textile waste. These examples raise awareness about fast consumption, fast fashion, and the throwaway society, while also demonstrating that textiles can serve both artistic, structural functions in interiors through recycling and upcycling. This study is expected to serve as a reference for contemporary architects/interior designers and textile designers/artists.

Keywords: Sustainability, Waste Textiles, Recycling, Upcycling, Art, Interior Space.

JEL Codes: Q01, Q53

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1. Introduction to Sustainable Textiles in the Design of Interior Spaces

Several factors, including global warming, changes in nature and climate, fast fashion, and fast consumption, are among the numerous factors that negatively affect the environment and the lives of living beings. Adopting the principle of leaving a livable environment for future generations and striving to combat these problems, sensitive individuals aim at protecting nature with social and humanitarian concerns, avoiding to exceed the self-renewal capacity of natural resources, and ensuring the sustainability of nature. It has been reported that approximately 7 to 9 billion tons of waste are generated on a global scale every single year, out of which an amount of 1.3 billion tons consists of municipal solid waste. According to current estimates, it is anticipated that the global annual generation of waste will double by the year 2050 through population growth together with urbanization (as cited in Altın, 2025). The preference for natural materials and the reutilization of industrial product wastes through recycling or upcycling methods also contribute to raising environmental awareness. By preserving the world's resources, our future can be secured. For fulfilling the needs and demands of future generations in a proper manner, it is important to protect resources, to use technology appropriately, and to make qualified investments.

The concept of sustainability is construed as the capacity to maintain, for the future generations, the functioning, processes, and productivity of ecological systems, all of which constitute its foundational basis (Chapin et al., 1996). In other words, sustainability refers to continuity. The foundation of sustainability consists of ensuring nature's productivity, people's awareness of the environment, resource preservation, pollution prevention, waste management and reuse, utilization of renewable and natural raw materials, and production of long-lasting products. Sustainability is defined as minimizing current resource consumption and human-induced harm to nature for biodiversity to continue and humanity's future needs to be efficiently fulfilled (Ercoşkun, 2007). A sustainable environment includes using durable furniture requiring minimum maintenance and produced from renewable resources. Sustainable design also involves creating healthy and clean environments for users. Moreover, a sustainable environment incorporates reuse and recycling to prevent waste accumulation in landfills, thus directly contributing to the objective of pollution prevention (Fathy, 2016).

The environmental damage caused by textile industry production affects all living beings through the pollution of air, water, and soil. Globally, the textile sector is considered one of the most ecologically harmful industries (Mensah et al., 2025). Following

plastic waste, textile waste ranks second worldwide. In the textile industry, approximately 92 million tons of textile waste are generated annually. Because of rapidly changing trends and rising purchasing power, the overconsumption of garments increases textile waste at the end of product lifecycles, leading to significant amounts of textile waste accumulating in landfills (Kasavan et al., 2021). This makes a significant adverse contribution to environmental pollution. Researches have revealed that 62 million tons of textile products are consumed annually. This figure is expected to reach 102 million tons by the year 2030. The textile industry constitutes 8.1% of global greenhouse gas emissions. Of the total fiber input that is utilized within the field of textiles worldwide, 87% is discarded into landfills. Less than 1% of these discarded fibers are recycled into new clothing items. While several companies previously prepared collections only twice a year for spring/summer and fall/winter, now at least four different trends are released annually, accelerating production. Therefore, under the influence of fast fashion, consumer frenzy is polluting the world rapidly (Türkmen, 2011). As a result of this, it reveals that textile waste is increasing with each passing day.

Textile waste refers to fabric or garments that become unsuitable for their intended purpose because of defective production. Textile waste is classified into three groups: pre-consumer waste, post-consumer waste, and post-industrial waste. Pre-consumer textile waste is defined as defective products such as fabric and yarn that are generated during the production of textiles. Post-consumer textile waste stems from discarding used textile products (clothing, home textiles, etc.). Post-industrial textile waste includes discarded products from sectors like medical textiles, automotive textiles, or packaging textiles (Tang, 2023). Liquid detergents used in the production stages of fibers, yarns, fabrics, and garments manufactured in the textile industry, solid waste generated during production, and harmful gases released into the environment are among the several factors creating environmental pollution. However, waste recycling significantly reduces carbon footprint (Stanescu, 2021).

According to European Union data, increasing textile waste in landfills and low recycling rates have altered people's habits of discarding unwanted garments. Instead of donating clothing for reuse, more items are being thrown away. Less than half of used garments are collected for recycling, and only 1% are turned into new garments, because technologies capable of transforming garments into pure fibers have only recently emerged (European Parliament, 2024). These textile wastes can be revitalized not only as new garments for users but also transformed into entirely different and new products or artworks.

Sustainable waste management, which occupies an important place at the national and global levels, is influenced by the potential of the waste in terms of its environmental impact and economic benefit. Within this context, waste management processes should be planned and implemented in accordance with life cycle and circular economy approaches. In this way, the environmental impact potential of the waste may be reduced, and therefore, by ensuring the maximum possible benefit is obtained from its economic value, the life cycle may be sustained in a healthy manner (Altın, 2025). In the ISO 14040 and ISO 14044 standards (LCA – Life Cycle Assessment), reference is made to the assessment of the life cycle. This assessment serves as a tool that evaluates the impact a product will generate on the environment throughout the entire process extending from the raw material stage to processing, production, distribution, and after-use recycling and final waste management (ISO 14040 and 14044:2006).

In interior space, the "design process" is a comprehensive term for describing designers' various working methods and stages of progress for each project (Badenduck, 2023). Within this process, the designer aims at ensuring the harmony of the space's elements -such as flooring, walls, ceilings, furniture- while considering user identity. In other words, interior space signifies more than the art of arranging spaces; it is a powerful discipline where cultural identity, social interaction, and historical narratives are expressed and shaped. As a reflection of social values and cultural dynamics, interior space promotes sustainability. Therefore, its evolution is not limited to aesthetics and functionality but also references the cultural and historical contexts of the spaces (Pinos Sarmiento, 2025). Both natural and artificial materials used in interior spaces must be evaluated with respect to their environmental, economic, and social impacts. Although using fewer materials may seem like a definitive solution for sustainability, the designer's simple detailing supports the successful completion of the design process (Gürani, 2024). Designers' environmentally friendly attitudes toward sustainable practices play a crucial role in encouraging the adoption of sustainable materials (McCoy, 2012). Interior designers, through proper material selection, create healthy interiors while simultaneously undertaking a significant role in contributing to environmental and economic sustainability (Szenasy, 2012).

In interior spaces, textile products are preferred for material selection based on lightness as well as design decisions about flexibility, mobility, and adaptability. Additionally, textiles' ease of application in interior spaces makes them a leading element in sustainable design. With technological advancements in recent years, textile materials have been used in various interior functions such as space di-

viders, sun control elements on windows, wall coverings, and furniture components, all providing high added value. Textile applications enhance the designer's creativity and identity, establishing the desired atmosphere in interior spaces (Canbolat & Gürani, 2010). Textile products offer both tactile and visual contributions to interior spaces. The textile surfaces used in interiors are expected to be both functional and aesthetic - small/large, hard/soft, horizontal/vertical uses. The texture and color of these textile surfaces evoke different feelings in users, giving them distinctive characteristics compared to other spaces (Avlanmaz Bilecen, 2020). Designers choosing sustainable textile products and requesting such materials from manufacturers will significantly contribute to sustainability in the textile sector (Yanılmaz, 2024).

In the process of designing interior spaces, sustainability transforms into a strategic planning process by giving preference to designs that are produced from long-lasting and renewable resources, with due consideration for the minimization of environmental pollution, prevention of the formation of waste, and preservation of natural resources (Bolulu & Merdan, 2025). Within this context, waste management, together with recycling and re-use, while being part of the circular economy, also presents an environmentally friendly design approach to the prevention of pollution at its source (Can & Ayvaz, 2017).

This study has focused, in addition to several fields in which waste can be utilized, on design applications that are created from textile waste within interior spaces, which defines the limitation of the study. The objective of this study is to investigate the conditions under which sustainable textile material can be incorporated into the life cycle within interior spaces, and furthermore to explore the possibilities of making use of waste materials within the space through diverse methods such as recycling and upcycling. Within this framework, selected examples possessing artistic or structural functionality that are produced from waste materials will be analyzed with respect to recycling and upcycling processes. This study aims to evaluate sustainable textile materials not only in relation to the role they play in terms of reducing the environmental impacts of sustainable textile materials, but also in connection with their innovative usage forms in interior spaces, material circularity, and resource efficiency. It is considered that with the selected examples, both a contribution will be made to sustainability goals and new aesthetic and functional possibilities will be created in the field of design. The scope of the study is limited to the artistic and functional use of new textile products, which are produced by means of recycling, upcycling, etc., within interior spaces. This research seeks solutions to the increasing problem of textile waste and how to transform it through appropriate processes.

2. Techniques of Recycling and Refunctionalization

Recycling is the process of transforming waste materials into new materials and objects. The recyclability of a material depends on its ability to regain its original properties (Kiron, 2022). "Recovery" refers to processing materials that have completed their useful life to make them reusable, whereas "recycling" refers to processing waste that cannot be reused into secondary raw materials through physical and/or chemical treatments. In recycling, the product's original properties are lost, resulting in lower-quality raw materials, while in recovery, the product is reused without losing its properties. To an extent, it is the transformation of old or discarded materials into useful and often aesthetically valuable products through design (Koşar et al., 2021). Upcycling refers to transforming a product for a different use without deteriorating the properties of the raw material or applying additional processing. By minimizing energy consumption in the transformation process, the concept of waste is also eliminated (Dal & Gökçe, 2019). Additionally, upcycling can be defined as assigning value to an existing product and transforming it into a creative item with a different use (Hamzah & Shaari, 2024).

Today, researchers and industry professionals emphasize that, beyond focusing on functionality and aesthetic quality, it is essential to implement environmentally friendly designs (Sorrento, 2012). Within this context, efforts to promote sustainable design are increasing everyday (Lee et al., 2013). With technological advancements, changing consumer behaviors, and growing environmental awareness, the reuse of waste materials in art and design will become more widespread in the future, enhancing sustainable design awareness (Koşar, et al., 2021). According to İşmal and Yıldırım (2011), various design models are being developed for producing environmentally sensitive designs (Design for Environment - DfE). They underline that these design models, also known as Eco-design or Green Design, are essential the textile industry characterized by excessive water and chemical consumption. They recommend that designers select materials offering maximum utility with minimal environmental damage and suggest the use of natural fibers or chemically recycled fibers derived from renewable resources. Additionally, studies on how renewable and bio-based products can integrate into different industries have been conducted. For example, bio-design products have become increasingly attractive in human life, influencing consumer behavior (Wang et al., 2017). Everyday various textile products generate waste piles which are collected, processed, reverted into fibers, and reintroduced for use.

According to 2024 data, the world generates 2.01 billion tons of solid waste annually. At least 33% of this is not properly managed, constituting serious environmental risks. As the global population increases, waste volumes are increasing sharply. Projections estimate global waste will reach 3.40 billion tons by 2050, more than double the population increase during the same period (The World Bank, 2025). Conscious waste management and recycling not only reduce waste volumes but also contribute to economic sustainability.

The rapid depletion of resources as well as climatic and environmental changes constitute significant concerns for designers and artists, who raise awareness through their environmentally conscious efforts. Various measures are taken to minimize the waste generated by end-of-life textiles and to carry out works in this area. The study focuses on textile wastes repurposed for interior textiles through recycling and upcycling methods from a sustainability perspective. In line with the research scope, sustainable textiles used in interior spaces will be examined both artistically and functionally, and the importance of the issue will be discussed through examples. Artistically discussed, sustainable textiles will be explained through recycled and upcycled examples in interior spaces, while functionally referenced recycled textiles will be evaluated on interior space and furniture scales.

3. Methodology

The research methodology employed has consisted of qualitative methods that include on-site observations, photographic documentation and recording, interviews, as well as document analysis. These methods have been evaluated within an analytical framework that allows for a systematic examination of the spatial, visual, and social dimensions of the object as an artistic or functional element. On-site observation and photographic documentation have allowed for the analysis of designs through the researcher's perspective, while interviews have revealed the experiences of artists and social awareness. A total of nine different examples were selected from textile production, utilizing recycling and upcycling methods, and encompassing systematic and functional components. Each of these examples differs in its production methods and areas of use. Data was collected through face-to-face and online interviews with a group of artists representing five examples. The remaining four examples were selected using document analysis methods. Document analysis, on the other hand, has contributed to the evaluation of the case study by supporting the findings obtained through the integration of relevant literature sources and available data.

4. Findings

4.1. Artistic Applications and Case Studies

When analyzed artistically, sustainable textiles appear in interior spaces through diverse areas of use. Frequently created using upcycling methods, these works, large or small in size, are produced from defective fabrics, garments, yarn waste, sample fabrics, tailor/factory wastes, or repurposed worn-out clothes, transformed into creative, original concepts. The five artistic examples discussed employ different techniques. The first example features the works of Deniz Sağdıç, a Fine Arts Faculty, Painting Department graduate. Utilizing advanced recycling techniques in sustainable art, Sağdıç transforms her works into art pieces by reducing them to specific sizes without damaging their structure, thereby changing their function. Her works are produced in her studio, operating entirely on upcycling principles. She renovated an old building following these principles, preserving its original structure while designing it to serve sustainability. She emphasizes that her studio, which she defines as a sustainable art house, is unique worldwide. Describing it as the sole place where art and sustainability meet, she notes that tourists from various countries visit several days a week. She explains that she uses environmentally friendly materials, has solar panels, and utilizes systems collecting rainwater. She sorts waste materials from different brands -such as upholstery fabric waste, label waste, and various textile wastes- to create her works. An overhead mirror system installed on the studio ceiling serves as an aid, allowing her to continuously assess the placement of each piece. Viewing the work's reflection helps her maintain perspective and avoid missing portrait details.

Sağdıç defines sustainable art as both the sustainability of art itself and of objects: Underlining the importance of art, *"Sustainability of art means diversifying its visual and functional applicability across spaces,"* she notes. *"Art is a part of daily life. Over the past 50–100 years, especially after wars, art has become more closed off, intellectualized, trapped in bohemian perceptions, buried under concepts, and confined to galleries and museums, being distanced to daily life. I believe this is not what art is and art has*

always been part of life, carrying its narrative since Göbeklitepe."

For this reason, she strives to diversify spaces, exhibiting her works wherever people spend their daily lives - shopping malls, hospitals, restaurants, airports, subways, and public spaces- arguing that both a 7-year-old child and 70-year-old adult engage their mental faculties through art. When viewers encounter artworks, they see a reflection of themselves, forming emotional connections.

Additionally, she tries to create awareness by presenting separated discarded items back to viewers. She emphasizes that each piece contains only one type of sorted object; she deliberately avoids combining various discarded items to prevent generating new waste from waste. *"Every object people discard is valuable because significant energy resources are consumed from production to consumption,"* she notes. *"I use defective fabrics, sample swatches, aged and decaying carpets and rugs - cutting, sewing, gluing, and assembling them"*. Through this process, she aims to subconsciously encourage people to separate and reuse materials accordingly. The artist believes that if her works serve merely decorative purposes, they risk becoming temporary and disposable. Therefore, she strives to create sustainable works by crafting stories that can be preserved for years: *"I am not in favor of art as a decorative element; it must be integrated into life, sustainable, and preserved across at least three to five generations, so I don't contribute to generating new waste. The longevity and usability of my works in interior spaces are essential."* (D. Sağdıç, personal communication, March 15, 2025).

At the Boyner store on Bağdat Avenue in Istanbul, designed as a sustainable space through upcycling, pipes and flooring from waste collection centers were used. Artist Deniz Sağdıç associated her works with the store by using defective and unsold textile products from the store. Her works are displayed on the basement, ground, and upper floors. She prefers locations where people pass through and frequently used by viewers, like stairheads and library entrance door, conveying messages on waste sorting culture, reuse, and sustainability (Figure 1).

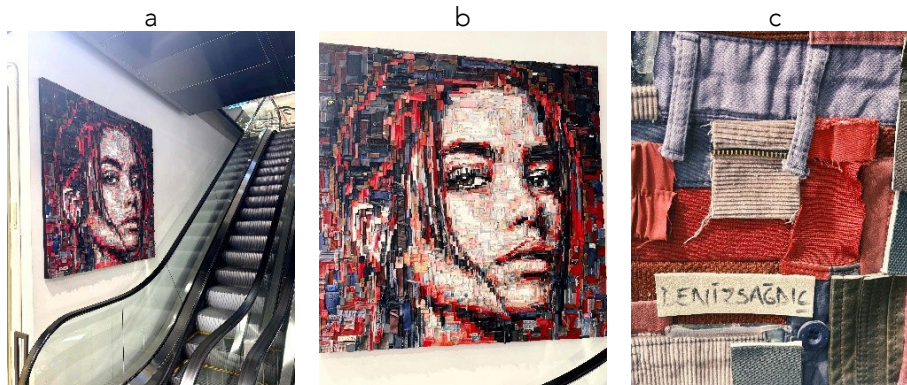


Figure 1. a. An art Work, Next to the Stairs Inside the Store, b.c. Detail

Source: Photographed by author, (February 04, 2025). Note: Deniz Sağdıç, Ready Remade Series, Waste Fabric Pieces, 150x150cm, 2021, Cadde Boyner Store, Bağdat Avenue, İstanbul

Combining weaving with printing and dyeing techniques using waste fabrics and yarns, Artist and academic Fatma Yelda Gezicioğlu studied at the Faculty and Institute of Fine Arts. With training in textile arts and weaving art/design, she produces works based on sustainability in Anatolian textile culture. Known and widely used centuries ago, these methods were developed to enable the reuse clothes and fabrics at the end of their useful life. They are described as converting textiles into yarn or fiber and creating new products through weaving (Gezicioğlu, 2022). Moreover, old fabrics have been combined using sewing techniques to create new uses and transformed into

different products for widespread use. Gezicioğlu merges these earlier conscious or unconscious eco-friendly practices with new techniques to create novel surfaces. She sources materials from factories and tailors, often using defective fabrics, yarns, or weaving waste (excess warp and weft on the loom's edges). She carefully considers surrounding objects when exhibiting art works and pays attention to the impact on the wall's texture, color, and natural/artificial light on the displayed work. All these factors support the work's narrative and enhance its message to viewers (Figure 2) (F.Y.Gezicioğlu, personal communication, January 04, 2025).



Figure 2. a. Interior Art Work, b. Detail

Source: Photographed by author (January 04, 2025)

Note: Fatma Yelda Gezicioğlu, "August 2020, From Orange to Blue / Bolu," 29x102cm, 2023

In addition to her two-dimensional works, Gezicioğlu combines woven fabrics using sewing techniques to create three-dimensional, voluminous artistic works. These works, also called sculptural weavings or woven sculptures, are designed for indoor spaces. The display allows viewers to walk around the sculptures, seeing them from multiple angles and forming different sculptural images from each perspective.

Believing that art spreads goodness and beauty, Laurine Malengreau creates large-scale textile paintings by combining silk and wool. Layering these materials and turning them into stories, she creates effective, bold, and creative works. She describes those as paintings that speak to the viewer. Her life experiences across different countries, early apprenticeships with artists, art history education, and commitment to the materials she uses bring strong energy to her works. Positioned between Eastern and Western cultures, her original creations innovate the tapestry tradition innovatively and contemporarily. As the inheritor of this traditional and contemporary

knowledge, she manually carries out all stages of textile creation, blending natural wool and silk through felting to produce non-woven fabrics with lightness and transparency. She states that this felting process requires no stitching or adhesives, avoiding environmental harm (Malengreau, 2025).

In a written interview on May 09, 2025, Malengreau explained that all her materials consist of natural, biodegradable fibers, mainly silk and wool, and her frames are made of wood or iron. She prefers to source materials locally in France or nearby. Occasionally, for certain colors, she obtains certified merino wool from the UK, ensuring animal welfare compliance. All artisans she collaborates with work within 10 km of her studio, emphasizing the importance of proximity, respect for materials, and respect for people she works with as her approach to sustainability. She buys silk fiber from a French family business selling slightly defective second-grade silk, underlining its usefulness, affordability, and waste prevention. She states that wool is a discarded material with very little added value worldwide. Waste wool is cleaned,

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dyed, carded, and turned into merino, ready for being used in her works. She also notes that to support local producers, she works with French merino processed by a cooperative, allowing full control over the wool's transformation process. The resulting durable textiles require no stitching or adhesives, eliminating environmentally harmful chemicals or adhesives. She adjusts her works based on several factors like exhibition space, considering factors like wall color, lighting, and nearby objects. She states

that she works differently for architects and individuals; when working for architects, she proceeds with the mood board they gave her, thus ensuring that her work matches the style, colors, and dimensions that architects envision for their clients. She also says that individual buyers purchase her works from galleries and she does not make any adaptations there, but simply transform the subjects that inspire her into works of art (Figure 3) (L. Malengreau, personal communication, May 09, 2025).

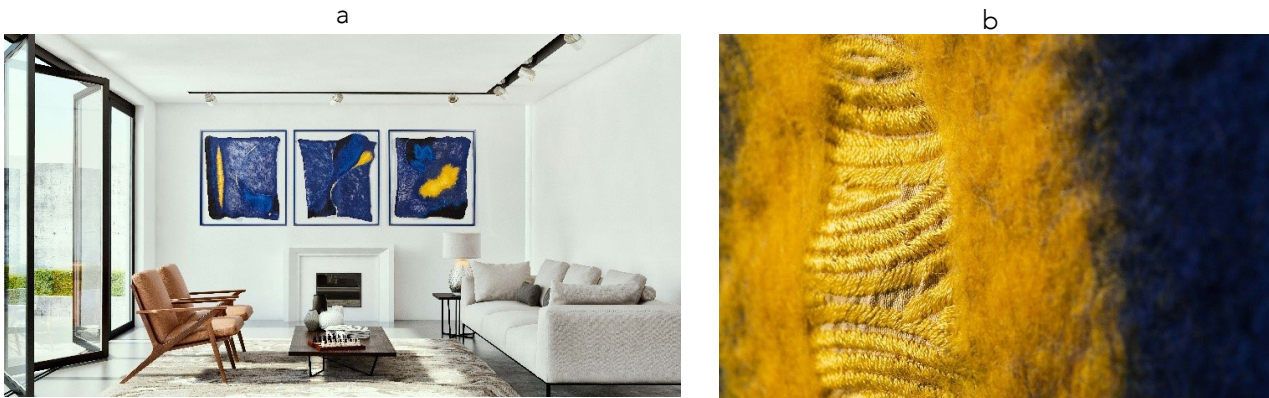


Figure 3. a. Interior Art Work b. Detail

Source: Adapted from Malengreau, (2025). Diapir

Note: "Bubbles of magma, incandescent marks and their path into the hollow of the night"
Triptych in Nuno Silk 157,48 x 49,21. Shenyang hotel, China.

Another artist working with textile waste, Vanessa Barragão, started her journey driven by a passion for reshaping. While studying Fashion Design at university, she researched the large amounts of waste generated by the textile industry and its harmful environmental impacts, deciding to recycle and reuse textile products. She made agreements with local textile factories in Portugal to collect most of their waste. "We have a saying in Portugal: What is trash for some is luxury for others. As creators, we must guide ourselves in that direction," says Barragão. In her works, she uses traditional techniques such as latch hooking, crochet, felting, weaving, embroidery, and macrame, thus preserving and continuing the techniques inherited from her ancestors. She also experiments with unconventional materials using new techniques to create unique surfaces. Each new material, she notes, presents its own challenges and aesthetics. Before use, she washes and sorts the materials by color, preparing a catalog. Although this process is long and requires significant storage space, she finds it rewarding to know that all these materials, otherwise destined for disposal, are reused (Carson, 2025).

In 2014, Vanessa Barragão established her own design studio, where she creates handmade wall tapestries, rugs, and wall decorations using only

recycled or discarded yarns. By combining various techniques, she creates a magical three-dimensional effect in textiles. She mainly works with textile waste, particularly wool leftovers from textile factories, occasionally complementing them with sustainable natural fibers when necessary. Stating to always prioritizing waste materials, she reflects her admiration for the ocean and all living beings through organic textures and layers inspired by marine life (East, 2020). She emphasizes that working with waste requires a flexible, intuitive approach, as colors, textures, and quantities vary, demanding creativity. She adapts her creative process according to available materials and sees this limitation as a strength. She believes that having a story behind each material adds meaning to the artwork and helps convey narratives through every selected piece. The uniqueness of each component of an artwork results from the artist's creativity. Beyond raising environmental awareness, the recycled fibers in Vanessa's works also address damage to coral reefs and the effects of chemicals released into oceans. She always considers the exhibition space, stressing the importance of wall color, lighting, and surrounding objects, ensuring that the detailed and often large artworks feel integrated into the space (Figure 4) (V. Barragão, personal communication, May 05, 2025).



Figure 4. a. Interior Art Work b. Detail

Source: Adapted from Palacete de São Bento (2021)

Note: Vanessa Barragao "Coral Vivo" 400x200cm displayed at Palacete de São Bento - Lisbon

Sandra Junele, an award-winning textile artist based in Dundee, Scotland, has a background in interior and textile design. Her work is known for its minimalist design, textural focus, and application in interior spaces. Junele combines fragmented, recycled industrial or consumer textile waste with handmade plant-based glue to create unique and sustainable wall panel installations and custom-molded artworks. She describes her panels as statement pieces for interiors, blending aesthetics with a sustainable message. She emphasizes that her innovative approach allows the materials to be submerged in water, disassembled, and reused, offering endless possibilities. Since she uses only natural fiber waste, one major challenge is that natural fibers are often blended with synthetic yarns, requiring careful

manual separation - a time-consuming and delicate task. However, she notes that the pre-consumer waste materials predominantly utilized in her work are typically not pre-sorted by color, which requires her to manually separate them individually according to color. She also incorporates unused or surplus materials, such as dead stock or defective colored yarn cones destined for disposal. In preparing her works for exhibition, she considers wall color, lighting conditions, surrounding objects or furniture, and the overall atmosphere of the space. Moreover, she takes into account the client's personal preferences and the intended function of the piece. She ensures that every detail in the design process serves both the visual and functional purpose of the artwork (Figure 5).

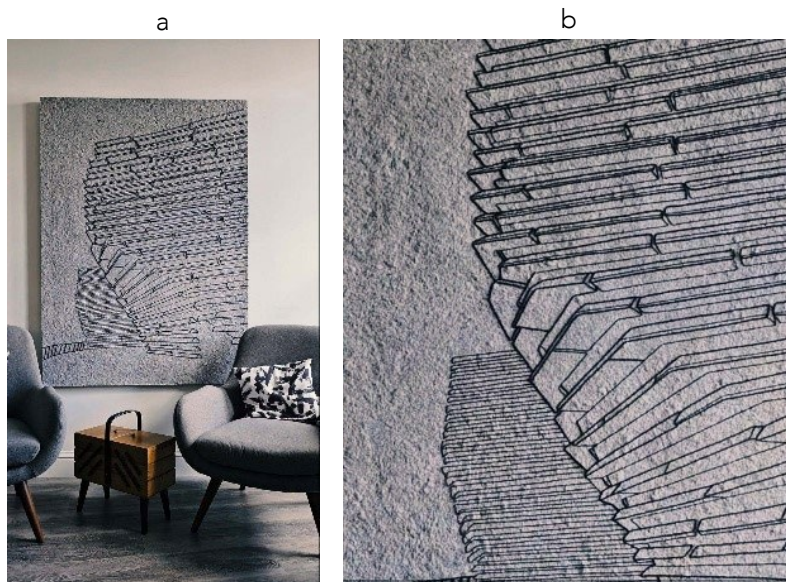


Figure 5. a. Interior Wall Panel b. Detail

Source: Adapted from Junele (n.d.)

Note: Sandra Junele, Work titled 3552, 115x160x4,5cm, 2024

Junele's passion for recycling originates from her childhood in Latvia, where she watched her grandfather make furniture from scrap wood. This ear-

ly experience sparked her interest in repurposing materials otherwise destined for landfills. Specializing in transforming discarded objects into art, she

works primarily with yarn waste. Junele mainly uses pre-consumer recycled natural fiber waste, preferably sourced from local producers in Scotland or the United Kingdom. Collaborating with designers, she encourages people today to think creatively about reducing their environmental impact (S. Junele, personal communication, April 14, 2025).

4.2. Functional Applications in Architectural Elements

Textile materials are used in many areas of interior spaces. The elements with structural properties created from products using textile waste within the scope of the study are those used for dividing/separating interior spaces, defining spaces, and setting boundaries. These textile products possess their own construction, functioning as load-bearing systems composed entirely of textiles. The favorable properties of textiles -lightness, formability, color variability, renewability, and replaceability- encourage designers to frequently utilize them in spaces.

Textile waste consists of:

- a. yarns, fibers, and textile waste produced during manufacturing, and
- b. post-consumer materials such as discarded home textiles (Pichardo et al., 2017).

Fibers obtained from textile waste are effectively integrated into organic and inorganic mixtures containing both natural and synthetic components, and these mixtures undergo extensive testing, particularly for mechanical, acoustic, thermal, and electrical properties (Patti, Cicala & Acierno, 2021). Based on the function to be undertaken by recycled textile products within structures, organic/inorganic additives improve the durability of recycled textiles. Fibers from various textile wastes are highly suitable for concrete reinforcement, offering lower costs compared to virgin fibers while reducing landfill waste. For example, leftover textile fragments from production are mixed with epoxy resin and sand to produce composites for lightweight structures. Although textile fibers do not enhance polymer concrete's bending and compressive strength, their addition

eliminate its brittleness. The use of these textile fibers eliminates a pollutant and provides an alternative material for the construction industry (Pichardo et al., 2017).

The first functional example involving textile material examined within the scope of this study is the innovative brick modules produced by FabBRICK, a France-based company founded by Clarisse Merlet. These innovative bricks are manufactured by recycling textile waste to create elements that provide both thermal and acoustic insulation. Molded into prismatic forms, the bricks constitute load-bearing components that not only define spatial boundaries but are also capable of standing independently. This method of transforming textile waste represents an environmentally sustainable approach and offers more ecological alternatives for the construction industry, which has traditionally lacked a strong environmental focus. The raw material used in these bricks is composed of shredded fabrics sourced from a supplier based in Normandy. Typically comprising cotton, polyester, elastane, and PVC, these fragments are blended with an eco-friendly adhesive developed in-house and poured into rectangular prism molds. Once filled, the mixture undergoes mechanical compression without any human intervention and is subsequently left to dry for approximately 15 days. The resulting modules can be assembled to form spatial dividers, seating elements, tables, coffee tables, and lighting fixtures. The final product is a novel construction material that is flame-retardant, acoustically absorptive, and resistant to moisture. From 12 tons of recycled textile waste, approximately 40,000 bricks are produced annually (Joe, 2021). These bricks serve as both aesthetically valuable architectural components and practical solutions for reducing textile waste in the industry. This product can be applied as cladding material over existing interior walls and enhances the acoustic quality of the space. Furthermore, these bricks are functionally sound enough to support lighting units and other interior elements (Figure 6). Ultimately, a highly durable, impact-resistant, fire-retardant, and moisture-proof material has been developed.



Figure 6. a. FabBrick bricks, in a Denim Store. b.at Galeria Lafayette Store.

Source: Adapted from Massoni (2024)

Note: a. FabBrick bricks were used in a denim store to create a surface surrounding the shelves with textile bricks, thereby defining the shelves. b. FabBrick brick display stand at Galeria Lafayette store.

With this example, it becomes possible to raise awareness among consumers by giving a second life to waste textiles. Also contributing to the creativity of the designer, these bricks create an identity within the interior space in the context of sustainability and enhance the store atmosphere in harmony with the marketed product.

By being recycled and reintroduced into life after the end of their useful life, products made from textile materials can be utilized in buildings. Globally, half of CO2 emissions originate from the construction sector. The second example examined in this study features the sustainable products of the company Kvadrat Really, which brings textiles back to life after their useful life ends and offers innovative solutions. This brand aims to expand the functional

uses of textiles within interior spaces through the production of tabletops, cabinet doors, and acoustic panels (Figure 7). According to the company's data, the production of a tabletop measuring 800 x 1600 mm requires approximately 70 cotton and wool T-shirts that reached the end of their lifecycle. While possessing the characteristic of being 100% recyclable, it also makes a contribution to the reduction of global waste accumulations and aims at ultimately reducing carbon emissions down to zero. The manufacturing company, which holds the ESRS (European Sustainability Reporting Standards), aims to expand its product range while also adopting innovative technologies that will extend the overall life span of its products by the year 2040 (Kvadrat, n.d.).

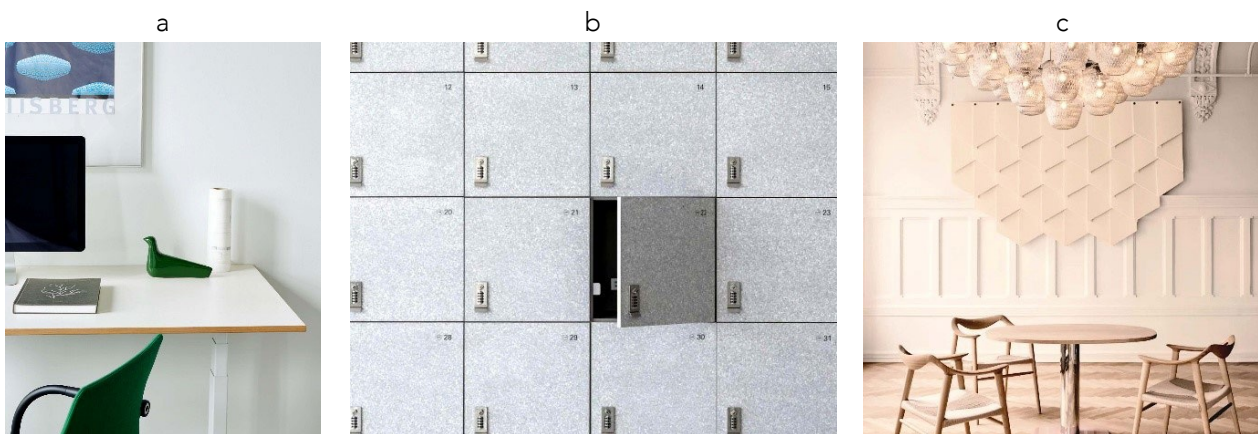


Figure 7. Recycled Textiles Used in Interior Spaces

Source: Adapted from Kvadrat (n.d.)

Note: a. Tabletops b. cabinet doors, c. acoustic panels

The company Swedish Stockings produces tables by mixing used tight stockings, both from its own production and from other brands, with fiberglass and molding them through injection casting. As a result of its collaboration with Frisinger's designer Gustaf Westman, the brand creates surfaces resembling

polished stone, bringing a distinctive atmosphere to the space. After learning that approximately two billion pairs of tights are worn only once and then discarded every year, the brand has established a waste collection system by rewarding customers who return used tights, regardless of their brand (Figure 8)

Transformation of Textile Materials: Artistic, Functional Applications in Interior Space

(Worthington, 2020). While stockings are known as petroleum-based products that never decompose, these innovative ideas can be seen as promising initiatives aimed at reducing the negative impact of the textile industry. The fluid material formed from

the stockings is cast into molds, resulting in mass forms that create furniture with an integrated structure. The texture of the particles forming these pieces of furniture generates a unique surface.

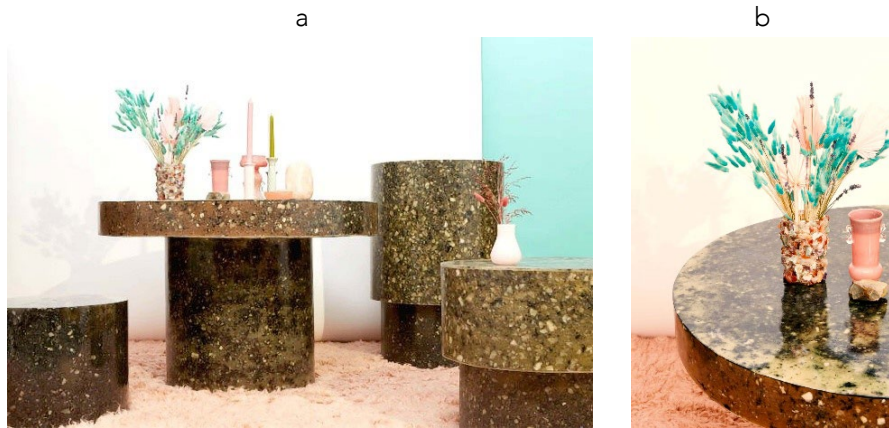


Figure 8. Furniture Made from Recycled Textiles

Source. Adapted from Worthington (2020)

Note. Although used stockings break down into smaller microplastics, they still remain in nature as waste and pose a threat to the environment. By mixing them with fiberglass and casting the mixture into molds, tables and coffee tables with polished, stone-like surfaces are produced.

In recent years, the issue of how to repurpose used textiles has become increasingly pressing. In response to this problem, researchers from the Technical University of Liberec in the Czech Republic, in collaboration with the country's social services organization Diakonie Broumov, have developed an innovative example of recycling. The final example presented in this article is a striking example that makes it possible to recycle textile products without the need to separate components such as buttons and zippers. The textiles, including zippers and buttons, are ground up and mixed with resin to produce solid boards. Initially, clothes hangers were made from these boards, and later, wall coverings for interior spaces were produced. The color of the

boards can enhance the design approach of the interior designer, allowing the intended atmosphere of the space to be fully realized. Research and development efforts on this new product are ongoing, and it appears to have the potential for wider use in the construction industry (Figure 9) (Pfefferová, 2025). Entered the market under the name Clutex, the brand not only contributes to reducing waste by transforming textile waste into a new product, but also fosters a sustainable and environmentally conscious approach that supports the designer's creative potential. Furthermore, it allows new ideas to emerge that can push the boundaries of composite materials, potentially serving as inspiration for the designers of the future.



Figure 9. Panels Made from Recycled Textiles

Source: Adapted from Pfefferová (2025)

Note: The panels produced by the company Clutex from waste textiles are used in wall coverings, kitchen backsplashes, and cabinet doors.

These environmentally friendly practices, of which artistic and functional examples are examined, are not limited to incorporating textile waste into the lifecycle by reducing waste piles, but also enable their dissemination in society by personalizing living spaces through methods such as recycling and upcycling.

5. Conclusion

The textile waste products examined within the scope

of this study consist of waste textiles either used by consumers after production or considered as production waste before reaching the consumer. This study is limited to textile materials with artistic and functional characteristics used in interior spaces. The designs created through recycling and upcycling methods in the examined examples generate an impact value in interiors. This impact value can be summarized in terms of its contribution to social, environmental, and economic sustainability (Figure 10).

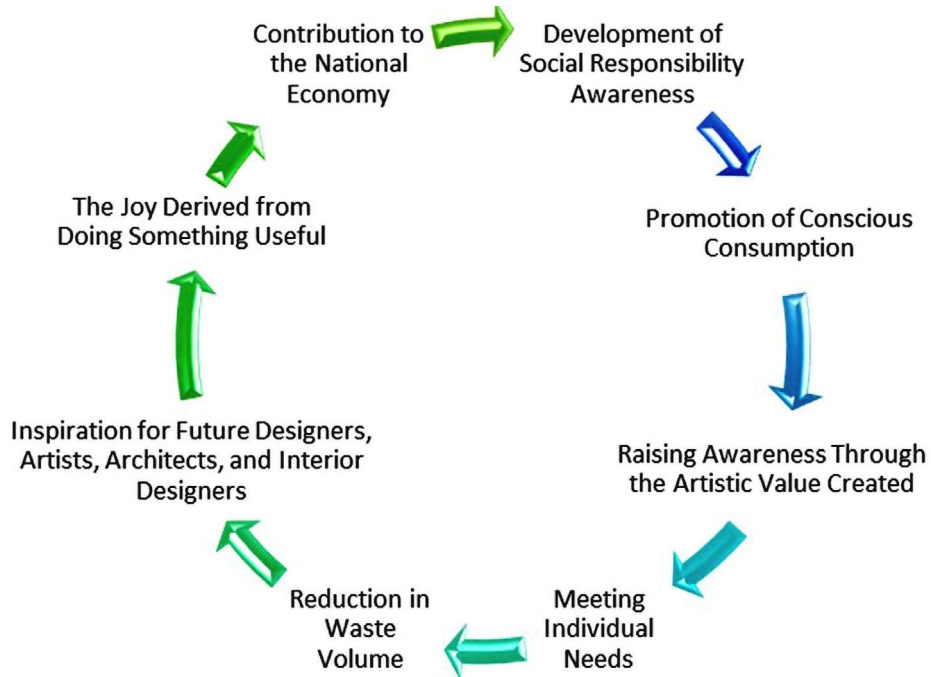


Figure 10. Graph of the Impact Value of Recycling and Upcycling Practices on Social, Environmental, and Economic Sustainability
Source: Created by the authors

In the examples examined under the categories of artistic and functional works, similarities were observed in the materials and methods used for interior textile waste applications. Nevertheless, notable differences were found in the production techniques of the designs created from textile waste. The source of these differences are considered to be whether

the products are of artistic or functional quality. The functions of the artworks or furniture pieces produced from textile waste determine their area of use within the interior space. Table 1 presents the use of textile waste in interior spaces within the context of sustainability.

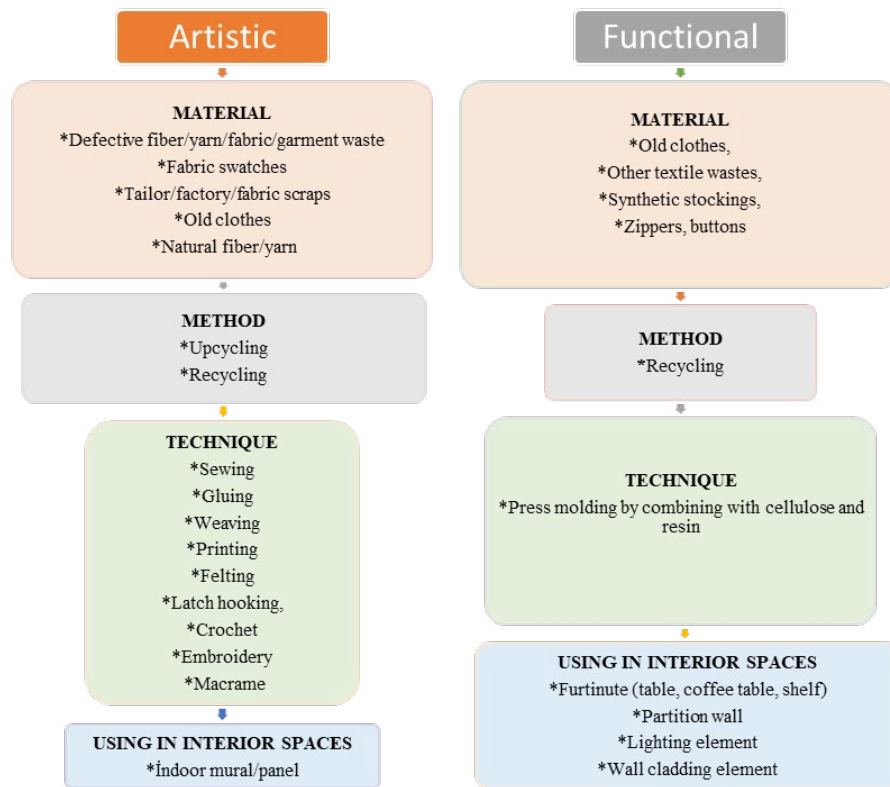


Figure 11. Comparison of Artistic and Functional Example

Source: Created by the authors

In line with today's increasingly important environmentally conscious mentality, studies are being conducted on where and how textile products that are widely used in every field and the waste generated after the end of their structural life can be repurposed. Facing with the rapid depletion of resources, the world has begun to take rapid and attentive steps toward the intelligent use of textile materials. In parallel, several national and international companies across the world are offering solutions to create new products from recycled textile waste. In order to reduce the amount of textile waste, which poses serious environmental problems, individual-level measures such as sorting waste and implementing recycling and upcycling practices are important. Materials that are no longer usable can be processed through various methods into raw materials, thus being transformed into beneficial and functional products based on the dynamics of the waste. Moreover, controlling consumption fosters awareness. These environmentally friendly practices promote environmental consciousness while also ensuring sustainability by personalizing living spaces.

This study emphasizes the importance of evaluating textiles in interior spaces from a sustainability perspective in terms of both artistic and functional qualities. Artistically, interior space textiles stand out as elements reflecting the spirit of a space and enriching users' emotional experiences. Aesthetic approaches combined with sustainable design principles support both environmental and social

sustainability. Functionally, the use of recyclable and environmentally friendly materials in the selection of interior textile materials, their energy efficiency, and long lifespan are important in attaining sustainability goals. These goals both reduce environmental impacts and improve users' quality of life. Although textile materials require high energy consumption during the production stage, achieving sustainability is possible through various practices. These include reusing through recycling and upcycling methods, preferring local producers, using natural materials, and sourcing materials from the nearby environment. This environmentally conscious approach supporting sustainability not only gives a second life to discarded textiles but also inspires us to rethink our consumption habits. By combining sustainability with creativity, textile waste used in both artistic and functional areas make living spaces enjoyable and comfortable while also drawing attention to environmental responsibility. Art is an important tool for the dissemination of this responsibility in society. Although recycled textiles used in interior architecture serve a structural function, they should also be regarded as an inspirational and aesthetic value.

Sustainable textiles used in interior spaces can create a memory that people frequently see, touch, and are affected by with each contact. The awareness that emerges from this experience can spread from one person to another, fostering environmental consciousness and supporting waste management. Presence of objects produced from waste materials

in densely populated areas will further raise awareness.

6. Discussion and Recommendations

The most important awareness required for the continuity of sustainability originates with education of people. The individual should consume with the knowledge and awareness of the life cycle of the products they are using, and societal consciousness should be raised with regard to re-use possibilities ranging from matters such as washing/care methods to how recycling/upcycling methods could be applied. In addition to these, in the education provided to textile and interior architecture design students, it is of importance that significant issues such as the selection of sustainable materials, environmentally friendly design principles, and circular economy are included. Furthermore, projects that will bring artists working with waste materials together with students in academia not only will raise consciousness among the designers of the future but also will serve to provide role models for those students. On the other hand, in companies that are engaged in industrial-scale mass production, it is of notable significance that training is offered on subjects related to sustainable production practices, including as water/energy consumption and waste management. Additionally, in order to raise the public consciousness, various projects may be carried out within the framework of University-Industry-Local Government-CSO cooperation with a focus on sustainability. In addition to all these, it is important that the central government establishes the necessary legal regulations that will encourage individuals to use such sustainable products and also develops policies that will support the producer. The regulation of waste collection through such legal instruments can provide the foundation for the formation of behavior patterns within society that are based on sustainability. Local production with sustainable textile materials will be another contributor to the reduction of the carbon footprint.

Technological innovations constitute an important factor for future directions as well. These innovations will provide the necessary ground for the development of new materials, thereby supporting that the resulting products are environmentally friendly. In addition to this, they will be able to make a contribution to sustainable textiles not only at the level of recyclable materials but also in aspects such as waste reduction and resource conservation in the processes of production and consumption.

In addition to the fact that products produced from waste materials provide benefits in numerous fields, the widespread use of these products may be insufficient in the face of cultural and consumption habits. The limited diversity of products made from waste materials currently in use may impose restrictions on

the originality of design. The generally high cost of sustainable products may create a negative impact when it comes to reaching a wide consumer base.

In conclusion, evaluating interior textiles from artistic and functional perspectives within the framework of sustainability not only helps reduce environmental impacts but also has the power to create aesthetic and functional spaces. In the future, innovative approaches and technologies in this field will contribute to the further development of sustainable interior architecture. Such practices will help reduce the rapidly growing waste that threatens the future, give form to the visions of interior designers, and inspire the designers of tomorrow.

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Ethical Statement

This study received ethical approval from the Ethics Committee of Tarsus University.

Conflict of Interest Statement

The authors declare no conflict of interest.

References

- Altın, S. (2025). Yaşam döngüsü analizi ve döngüsel ekonomi yaklaşımları ile sürdürülebilir biyoatık yönetimi. *Ulusal Çevre Bilimleri Araştırma Dergisi*, 7(2), 55-68. <https://izlik.org/JA28ED25YD>
- Avlanmaz Bilecen, E. (2020). İç mekân tasarımı tekstil seçiminde performans ölçütlerinin değerlendirilmesi. *Artium*, 8(1), 61-67. <https://izlik.org/JA63YZ82SW>
- Badenduck, N. (2023). Nebulous, abstract, elusive: Examining design concepts within interiors practice and pedagogy. *Journal of Interior Design*, 49(2), 75-81. <https://doi.org/10.1177/10717641231202472>
- Bolulu, G., & Merdan, N. (2025). İç mekan tekstillerinde sürdürülebilir yaklaşımlar, 7th International Symposium on Innovation in Architecture, Planning and Design June 27-28, 2025, ss.53-60| Gaziantep – Türkiye
- Can, Ö., & Ayvaz, K. (2017). Tekstil ve modada sürdürülebilirlik. *Akademia Doğa ve İnsan Bilimleri Dergisi*, vol.3, no.1, pp.110-119. <https://izlik.org/JA92YA72ER>
- Canbolat, T., & Gürani, F. Y. (2010, April 29-30). Sürdürülebilir tasarım yaklaşımı olarak iç mimaride tekstil kullanımı. VI. Uluslararası Sinan Sempozyumu (pp. 308-314). Edirne, Türkiye.
- Carson, M. (2025). Recycling in textile art: Five artists. *TextileArtist.org*. <https://www.textileartist.org/recycling-in-textile-art/>
- Chapin, F. S. III, Torn, M. S., & Tateno, M. (1996). Principles of ecosystem sustainability. *American Naturalist*, 148(6), 1016-1037. <https://doi.org/10.1086/285969>
- Dal, İ., & Cengiz Gökçe, G. (2019). Sürdürülebilirlik yolunda "İleri dönüşüm": Bir atölye çalışması. *İnönü Üniversitesi Sanat ve Tasarım Dergisi*, 9(20), 30-38. <https://doi.org/10.16950/iujad.654300>
- East. (Jan 23, 2020). Textile Artist Vanessa Barragão, https://www.east.co.uk/blogs/journal/textile-artist-vanessa-barragao?srsltid=AfmBOo03_cFfuLJzayc9BmTj6D8gsfeH_Tn2TX3Vda_nSd-

1Y8o42wiM

Eroçşkun, Ö. Y. (2007). Sürdürülebilir kent için ekolojik-teknolojik (EKO-TEK) tasarım: Ankara-Güdül örneği [Doctoral dissertation, Gazi University]. Gazi University Graduate School of Science.

European Parliament. (2024). The impact of textile production and waste on the environment (infographics). <https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics>

Fathy, A. (2016). Sustainable textile materials in interiors. In 11th International Conference on Urban Regeneration and Sustainability (SC 2016) (pp. 636–637). WIT Conferences. www.witconferences.com

Gezicioğlu, F. Y. (2022). Geleneksel çaput/cacala/pala dokumalarına sürdürülebilirlik bağlamında çağdaş bir yorum: Hacim etkili sanatsal dokuma önerileri. *Jass Studies - The Journal of Academic Social Science Studies*, 15(89), 215–232. <http://dx.doi.org/10.29228/JASSS.57465>

Gürani, F. Y. (2024). Sürdürülebilir yapı malzemelerinin seçim kriterleri. Z. Ö. Parlak Biçer (Ed.), *Mimarlıkta yapı bilgisi* (Bölüm 10, pp. 253–262). Akademisyen Kitapevi.

Hamzah, A., & Shaari, N. (2024). Upcycle textile towards value-added product as creative community practices in Malaysia. *International Journal of Research and Innovation in Social Science (IJRISS)*, 8(6). <https://doi.org/10.47772/IJRISS>

ISO 14040: 2006 Environmental Management – Life Cycle Assessment –Principles and Framework (<https://www.iso.org/standard/37456.html>).

ISO 14044: 2006 Environmental Management – Life Cycle Assessment –Principles and Framework (<https://www.iso.org/standard/37456.html>).

İşmal, E., & Yıldırım, L. Ö. (2011). Tekstil tasarımında çevre dostu yaklaşımlar. *Akdeniz Sanat Dergisi*, 4(8), 9–13. <https://dergipark.org.tr/en/pub/akdenizsanat/issue/27655/291482>

Joe, T. (2021). Green Queen. FabBRICK: Meet French architect Clarisse Merlet who converts your old clothes into bricks. <https://www.greenqueen.com.hk/fabbrick-meet-french-architect-clarisse-merlet-who-converts-your-old-clothes-into-bricks/>

Junele. (n.d.). <https://www.junele.co.uk/>

Kasavan, S., Yusoff, S., Guan, N. C., Zaman, N. S. K., & Fakri, M. F. R. (2021). Global trends of textile waste research from 2005 to 2020 using bibliometric analysis. *Environmental Science and Pollution Research*, 28, 44780–44794. <https://doi.org/10.1007/s11356-021-15303-5>

Kiron, M. I. (2022, December 6). Recycling and sustainability in textile: Present situation, challenges and future. <https://textilelearner.net/recycling-and-sustainability-in-textile/>

Koşar, S. T. A., Gezicioğlu, F. Y., & Yalçın, M. B. (2021). Üniversiteilerin tekstil ve moda tasarımı öğretim programında artan/atık/atık malzemenin geri kazanımı ve sürdürülebilirliği üzerine bir araştırma. *Turkish Studies*, 16(2), 719–741. <https://dx.doi.org/10.7827/TurkishStudies.49880>

Kvadrat. (n.d.). Kvadrat Really. <https://www.kvadrat.dk/en/kvadrat-really>

Lee, E., Allen, A., & Kim, B. (2013). Interior design practitioner motivations for specifying sustainable materials: Applying the theory of planned behavior to residential design. *Journal of Interior Design*, 38(4), 1–16. <https://doi.org/10.1111/joid.12017>

Malengreau, L. (2025). Diapir. <https://www.laurinemalengreau.com/reference/diapir/?lang=en>

Malengreau, L. (2025). <https://www.laurinemalengreau.com/?lang=en>

Massoni, E. (2024). Textile upcycling: Da morbido a solido. *Interni Magazine* <https://www.internimagazine.com/design/materials/textile-upcycling-da-morbido-a-solido/>

McCoy, J. (2012). Sustainability: Environmentally responsible interior design. *Journal of Interior Design*, 37(1), 5–6. <https://doi.org/10.1111/j.1939-1668.2011.01070.x>

Mensah, R. O., Frimpong, A., Bruce-Amartey Jnr, E., Acquaye, R., Lamptey, L., & Opoku, D. (2025). The nexus between crime and textiles: Exploring the sustainability strategies of Ghana's textile industry through the lens of routine activity theory. *Textile*, 1–25. <https://doi.org/10.1080/14759756.2024.2447106>

Palacete de São Bento [@vanessabarragao_work]. (2021, December 6). "Coral Vivo 400x200cm displayed at Palacete de São Bento - Lisbon [Photograph]. <https://www.instagram.com/p/CXJ-SOVQIYUj/>

Patti, A., Cicala, G., & Acierno, D. (2021). Eco-sustainability of the textile production: Waste recovery and current recycling in the composites world. *Polymers*, 13(1), 134. <https://doi.org/10.3390/polym13010134>

Pfefferová, R. (April 02, 2025). Recycled textile boards are turning waste into useful products. European Cluster Collaboration Platform. <https://www.clustercollaboration.eu/content/recycled-textile-boards-are-turning-waste-useful-products>

Pichardo, P. P., Martínez-Barrera, G., Martínez-López, M., Ureña-Núñez, F., & Ávila-Córdoba, L. I. (2017). Waste and recycled textiles as reinforcements of building materials. In E. Günay (Ed.), *Natural and artificial fiber-reinforced composites as renewable sources*. <https://doi.org/10.5772/intechopen.70620>

Pinos Sarmiento, E. V. (2025). Building identities: A path to diversity and decolonization of interiors in Latin America. *Journal of Interior Design*, 50(1), 49–61. <https://doi.org/10.1177/10717641251316803>

Sorrento, L. (2012). A natural balance: Interior design, human, and sustainability. *Journal of Interior Design*, 37(2), ix–xxiv. <https://doi.org/10.1111/j.1939-1668.2012.01075.x>

Stanescu, M. D. (2021). State of the art of post-consumer textile waste upcycling to reach the zero waste milestone. *Environmental Science and Pollution Research*, 28, 14253–14270. <https://doi.org/10.1007/s11356-021-12416-9>

Szenasy, S. S. (2012). Reflections on sustainable design. *Journal of Interior Design*, 37(1), 7–8. <https://doi.org/10.1111/j.1939-1668.2011.01071.x>

Tang, K. H. D. (2023). State of the art in textile waste management: A review. *Textiles*, 3(4), 454–467. <https://doi.org/10.3390/textiles3040027>

The World Bank. (2025). Trends in solid waste management. https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

Türkmen, N. (2011). Sürdürülebilir bir tekstil endüstrisi için "yavaşlık" ve alternatif üretim modelleri. *Akdeniz Sanat*, 4(8), 14–18. <https://izlik.org/JA44ES79YC>

Wang, Y., Luo, S., Liu, S., Lu, Y., & Hansen, P. (2017). Crafting concrete as a material for enhancing meaningful interaction. In *International Conference on Human-Computer Interaction (HCI)* (pp. 634–644). Springer. https://doi.org/10.1007/978-3-319-58071-5_48

Worthington, K. (August 12, 2020). Recycled tights and textile waste: The new materials making an impact in design. *Elle Decoration*. <https://www.elledecoration.co.uk/design/a33583178/recycled-tights-and-textile-waste-in-design/>

Yanılmaz, Z. (2024). İç mekânda sürdürülebilir tekstil ürünleri. In M. Dal (Ed.), *Mimarlıkta yenilik (İlleyen uygulama ve araştırma için tasarım, yöntemler ve teknoloji)*. Livre de Lyon.