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Sustainable model design and mold making: An experimental study with draping and origami techniques

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Abstract

This study explores the integration of draping and origami techniques as an innovative approach to contemporary fashion design. Draping enables the direct development of three-dimensional forms on a mannequin, while origami introduces structured folding methods that generate precise lines and sculptural forms. Although both techniques are well established individually, existing research rarely examines their combined application as a systematic design methodology, revealing a clear gap in fashion design scholarship. The objective of this study is to investigate how the integration of draping and origami can enhance creative expression, functional performance, and sustainable pattern development. The research adopts an experimental and practice-based methodology involving conceptual development, form exploration, experimental folding, pattern making through draping, and modeling on a mannequin. The resulting designs were evaluated using aesthetic and functional criteria, alongside considerations of material properties, production processes, and sustainability. The findings demonstrate that the combined use of draping and origami supports innovative form generation, reduces material waste, and encourages adaptable pattern-making practices. The study highlights the potential of this integrated approach to advance sustainable and creative fashion design and offers valuable implications for designers, educators, and students seeking environmentally responsive and conceptually driven design methodologies.

***Keywords*:** Creative design; draping; fashion education; origami; sustainable pattern making.

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1. INTRODUCTION

Fashion design is not merely an aesthetic pursuit, but a multifaceted discipline constantly interacting with cultural, technological, and environmental changes. Designers seek new forms of expression, going beyond traditional methods; in this context, they are turning to innovative methods that integrate technical skills, creative thinking, and material knowledge, as well as contemporary approaches such as sustainability. Draping, one of the prominent methods in fashion design, is an intuitive and three-dimensional design approach that allows the fabric to be directly shaped on the mannequin (Armstrong, 2011). This method allows the design to directly interact with the body by considering the natural fluidity and drape of the fabric (Jenkyn, 2005). Unlike two-dimensional pattern systems, the draping technique requires three-dimensional thinking, and the designer's direct contact with the fabric gives the creative process an intuitive and experimental quality. Thus, forms that adapt to the user not only aesthetically but also functionally emerge.

Although the history of draping dates back quite a long time, it began to be widely used in the 20th century by pioneering designers such as Madeleine Vionnet. Vionnet's bias cuts and techniques that allowed the fabric to drape freely over the body represent a radical turning point in the history of fashion (Wilcox, 2007). Today, draping is included in fashion education and industry, both as part of the design process and as a pattern development technique. Studies on draping behavior in textile materials further demonstrate how drape influences both garment aesthetics and functional performance, reinforcing its significance in contemporary fashion and textiles research (Wang et al., 2025). Draping techniques, by prioritizing the natural flow and form of the fabric, demonstrate an environmentally friendly approach as they create less material waste and require fewer trial-and-error stages (Fletcher, 2013).

The term "origami" refers to the art of paper folding originating in Japan and reflects a historical practice dating back to the 1600s, involving the transformation of paper into representational and abstract forms. However, the modern understanding of origami as we know it today emerged in the 1940s and 1950s with Robert Harbin and Lillian. It was shaped by the contributions of pioneering figures such as Oppenheimer and Akira Yoshizawa (Lang, 2012).

Origami, a Japanese art of paper folding, has been successfully integrated into the fields of textile and fashion design in recent years. In fashion and textile design, the origami technique makes it possible to obtain geometric, structural, and innovative forms through the folding of fabric, creating sharp lines and innovative forms through folding and shaping methods. Folding techniques in apparel have been shown to contribute to both structural innovation and design diversity, as well as enabling exploration of new forms that marry aesthetics and functionality (Wu, 2024). The origami technique, which allows for the creation of sculptural and architectural forms through the folding and shaping of fabric, holds significant potential in fashion design in terms of both visual diversity and structural innovation (Choi, 2016). Folding techniques add a third dimension to a flat surface while also requiring a reinterpretation of the fabric's physical properties, such as stiffness, elasticity, orientation, and texture.

The integration of origami techniques into fashion design is not limited to aesthetic concerns alone. Surfaces created through folding and structural analysis increase the usability of the fabric while also minimizing textile waste. Research on circular fashion design also highlights how structural and folding techniques can be integrated into broader waste-reducing strategies in garment manufacturing (Aus et al., 2021). In this context, origami techniques become not only a means of artistic expression but also a part of sustainable production processes (Gale & Kaur, 2002).

Among fashion designers inspired by the art of origami is Issey, of Japanese origin. Miyake, Junya Watanabe (Comme), des Garçons, Yosiki Hishinuma and Hiroaki. Besides names like Ohya, Hussein, Western constructivist and deconstructivist designers such as Chalayan, Viktor & Rolf, John Galliano, and Calvin Klein are also included. The origami-inspired fashion sense is most evident in Japanese fashion. One of the most iconic names in this field is Issey. Miyake develops its designs based on the traditional Japanese flat-cut garment form; addressing the relationship between fabric and body with a multifaceted engineering approach, it utilizes innovative fabric manipulations and advanced technological processes. Miyake founded " Pleats " in 1993. " Please " has created many innovative origami-themed designs with its "A-POC" collection in 1998 and "132 5" in 2010. The " Please

" collection was produced using a pioneering method where the fabric was first cut and sewn, then pleats were created. The "A-POC" collection, on the other hand, features long pieces of fabric that require no sewing, are simply cut and worn directly by the user, thus preventing fabric waste (Mitchell, 2005).

Western fashion designers, drawing inspiration from the art of origami, mostly create haute couture designs. They tend to integrate the structural forms and details of the couture tradition into their collections by interpreting them. One notable example of this approach is Christian. Dior's Spring/Summer 2007 haute couture collection was exhibited in the couture collection by John Galliano. Galliano, traditional haute He blended couture tailoring with geometric origami details and highlighted the bold color palette characteristic of Japanese clothing in his designs. Similarly, Calvin Klein's Spring/Summer 2008 collection was notable for its highly wearable coats, suits, and dresses structured with origami-inspired architectural forms. The avant-garde design duo Viktor & Rolf's Autumn/Winter 2011 collection featured futuristic, bespoke coats and jackets structured with pinwheel-shaped origami folds and pleats. Gareth Pugh's Spring/Summer 2009 collection, Givenchy's Spring/Summer 2008 couture collection, and Thom Browne's Spring/Summer 2014 collection all demonstrate the aesthetic and structural possibilities that origami offers in fashion design (Choi, 2016). Junya Watanabe's 2025 Ready to The influence of origami continues to be seen in Wear's runway and commercial collections (Vogue, 2025).

The combination of these two techniques allows for unique results in the design process, both aesthetically and functionally, and is gaining increasing importance in design processes today, with the concept of sustainable fashion. In this context, the integration of draping and origami techniques, in the face of the limitations of traditional pattern-making methods, enhances both aesthetic expression and functionality in fashion design, while the question of how this combination can contribute to sustainable design processes constitutes the main problem of this study.

1.1. Purpose of study

Although both techniques are well established individually, existing research rarely examines their combined application as a systematic design methodology, revealing a clear gap in fashion design scholarship. The objective of this study is to investigate how the integration of draping and origami can enhance creative expression, functional performance, and sustainable pattern development.

2. METHOD AND MATERIALS

2.1. Research design

This research is structured as a process-oriented qualitative study. This study, which involves creative practices in the field of fashion design, focuses on design-based research. The research approach adopted is as follows: The main purpose of the research is to examine the design process developed by integrating draping and origami techniques, and to evaluate the results obtained through the creative production process from sustainable, aesthetic, and functional perspectives.

In this context, the research adopts an experiential approach focused on the design process rather than classical experimental designs, combining theoretical knowledge with creative application. Forms developed throughout the process, and observations were used as qualitative data sources.

The researcher, drawing inspiration from draping and origami techniques, examines the search for structural forms in fashion design within a minimalist and avant-garde framework. The design process is conducted through a hands-on approach based on trial and error and improvisation; original garment forms are created by directly shaping the fabric on a mannequin and molding it using folding techniques. Draping allows for the intuitive emergence of three-dimensional structures by utilizing the fluidity and volume of the fabric, while origami techniques enable the development of sharp lines and architecturally significant surfaces through folding. The research aims to demonstrate how these techniques can be integrated with a process-oriented research approach and how this combination offers innovative solutions in fashion design, both aesthetically and functionally.

2.2. Data collection procedure and analysis

The research is based on a review of academic literature on resources that support the creative process, namely, fashion history, draping techniques, origami, and sustainability. Data collection was carried out through hands-on observation, visual analysis, and processing documentation. A total of five women's clothing models were developed within the scope of the research. Both draping and origami techniques were used holistically in each design. The implementation process was carried out in four stages: Conceptual Development, Form Search and Experimental Folding, Draping on a Mannequin, Pattern Making, and Modeling.

Each of the developed designs was analyzed in detail under the headings of "Conceptual Framework, Fabric Type and Technical Applications, Form-Texture and Volume Analysis, Balance of Aesthetics and Functionality, Sustainability Dimension," taking into account the production process and the characteristics of the materials used.

2.3. Ethical consideration

Ethical principles were adhered to throughout the research process; all visual materials used were original productions created by the researcher. Images or materials belonging to others were not used without proper attribution, and quotations were cited in accordance with literature standards. Since no participants or human subjects were involved in the applications, ethical committee approval was not required.

2.4. Limitations of the study

The limitations of this research lie in its reliance on individual applications and the creative process. The findings were evaluated within the context of the researcher's production process, rather than on large sample groups. Furthermore, the analysis focused on only six models and was not extended to different clothing categories. The types of fabrics used were limited in terms of availability and technical specifications. The use of a mannequin for the design meant that ergonomic analyses for different body types were excluded. Finally, the collection was not evaluated based on user feedback; the focus was solely on the design process and outcome.

3. RESULTS

In this study, a five-piece women's clothing collection was designed by the researcher using origami and draping techniques. The collection includes skirts, jackets, dresses, trousers, blouses, and bustiers. Each design was developed by directly shaping the fabric or fitting the interfacing on the mannequin and creatively applying folding techniques. The collection demonstrates the potential of the synthesis of draping and origami in women's clothing, not only through its formal creativity but also through its use of materials and technical diversity.

Draping and origami techniques were used holistically in each design. The implementation process was carried out in four stages:

Conceptual Development: The design idea was determined by establishing a relationship between draping and origami.

Form Exploration and Experimental Folding: Geometric folds based on origami techniques were tested on paper and proofing interfacing, and adaptable forms for fabric were analyzed.

Draping on a Mannequin: The determined folds and forms are shaped directly on the mannequin using fabric or fitting interfacing.

Mold Making and Modeling: Molds were created, and final products were produced based on the resulting volumes and forms.

Each of the developed designs was evaluated from both aesthetic and functional perspectives in line with the main objectives of the research. The analyses considered not only visual characteristics but also the

production process, the properties of the materials used, and sustainability aspects. Within this scope, each design had elements of the following;

Conceptual Framework: The starting point, source of inspiration, and overall design concept.

Fabric Type and Technical Applications: The characteristics of the materials used, the role of techniques such as sewing/ draping /origami,

Form, Texture, and Volume Analysis: Silhouette, surface features, three-dimensional appearance, and volume balance,

Balance between Aesthetics and Functionality: The balance between the visual appeal of the design and ease of use,

Sustainability Dimension: This aspect has been analyzed in detail under the headings of reducing waste in fabric selection, production processes, and technical applications, versatile use, and ecological benefits.

3.1. Design 1

Figure 1 below depicts the designs in design 1.

Figure 1
Design 1

Conceptual Framework: This design aims to create a balanced silhouette through the combination of a minimalist lower form (pants) and a decorative upper form (blouse). The overall structure of the design relies on draping. By combining fluidity with the structural integrity of origami-inspired folds, it creates a strong aesthetic and functional unity.

Fabric Type and Technical Applications: The trousers are made of crepe fabric, and their flowing and draped structure allows the lower part to present an elegant silhouette. Details structured using origami folding techniques at the front waist of the trousers add an architectural emphasis to the design. In the blouse, the crepe fabric bodice and organza brocade sleeves present a contrasting unity. The origami folds applied especially to the left shoulder of the blouse add an asymmetrical and avant-garde aesthetic to the design.

Form, Texture, and Volume Analysis: The design exhibits a dynamic visual unity through the juxtaposition of different textures and volumes. The straight lines of the trousers are elevated to an architectural depth by the origami folds at the waist, moving away from the ordinary. The fluidity of the crepe fabric on the bodice of the blouse contrasts with the brocade texture of the sleeves and the origami fold on the left shoulder. Thus, the design acquires a three-dimensional character that both breaks symmetry and creates a dramatic silhouette.

A Balance Between Aesthetics and Functionality: The blouse's asymmetrical shoulder detail and the origami detail at the waist of the trousers make the garment not only aesthetically pleasing but also an innovative and original design product. The comfortable form of the trousers maintains functionality, while the origami folds and organza sleeves enhance the aesthetic emphasis. This makes the design both an avant-garde piece suitable for the runway and a functional, combinable item.

Sustainability Connection: Draping techniques that guide the fabric directly onto the mannequin minimize waste in the production process. Creating origami-like folds from a single piece of fabric reduces the need for additional materials, supporting a sustainable fashion approach. Furthermore, the combination of different textures (crepe and organza brocade) demonstrates the efficient use of existing materials.

3.2. Design 2

Figure 2 below depicts the second design and the procedure for creating it.

Figure 2
Design 2

Conceptual Framework: This design is a women's suit created with an avant-garde approach, integrating draping and origami techniques. The jacket features dramatic silhouettes achieved through origami folds at the collar and shoulders, while the skirt incorporates geometric folding details for an architectural effect. The pursuit of strong forms, integrated with minimalist lines, highlights the elegance and dynamism of the modern woman.

Fabric Type and Technical Applications: The jacket is crafted by combining the rich textural quality of brocade fabric with the matte surface of cotton. This combination creates a visual contrast between the rich texture and the simple surface. The skirt is also made of cotton fabric and formed using the origami folding technique.

Form, Texture, and Volume Analysis: The brocade fabric used in the jacket creates depth with its embossed texture, while the cotton fabric accentuates the form with its contrasting effect. The origami details, especially those extending towards the armholes, make the shoulders appear more upright and powerful, giving the design a sculptural stance. The form, which sits at the waist and opens up in the lower section, creates a balanced silhouette. In the skirt design, the origami folds on the front surface break the simple, flat form, providing an architectural dynamism.

Balance of Aesthetics and Functionality: The suit offers a holistic design in terms of both aesthetics and functionality. The origami detail on the shoulder line of the jacket and the avant-garde collar form create a strong aesthetic statement, while the origami folds on the skirt support the overall harmony. In terms of functionality, the design adapts to different occasions, from formal events to special occasions.

Sustainability Connection: The use of durable fabrics like brocade ensures the design's longevity, contributing positively to sustainability. Furthermore, its timeless design concept allows for extended use rather than rapid consumption, aligning with sustainable fashion principles.

3.3. Design 3

Figure 3 below depicts the second design and the procedure for creating it.

Figure 3
Design 3

Conceptual Framework: This design highlights the fusion of feminine elegance and sculptural volumes. The voluminous forms created with origami-style folds at the shoulder line offer dramatic visual appeal, while the varying dart calculations applied to the skirt and waistline add a unique structural quality to the design. The design embodies an approach that integrates modern couture aesthetics with traditional craftsmanship.

Fabric Type and Technical Applications: The dress is crafted from a combination of lustrous satin fabric and textured organza brocade. The fluidity of the satin fabric provides movement and drape in the skirt form, while the stiff and firm structure of the brocade fabric supports the origami-effect folds in the shoulder area. A voluminous form is achieved at the waistline through the application of various darts.

Form, Texture, Volume Analysis: The voluminous folds at the shoulder line lend a sculptural power to the design and shift the focal point upwards. This detail reflects the power of the origami technique to create three-dimensional forms. The alternating darts applied at the hem and waistline create a silhouette that is voluminous beneath the fitted form. The contrast between the lustrous surface of satin and the matte-textured structure of brocade allows for both visual richness and a dynamic interplay of textures.

Balance between Aesthetics and Functionality: The folds at the shoulders create a dramatic visual effect, while the play of volume at the waist and hem makes the body appear slimmer. Aesthetically, a balance is achieved between avant-garde and classic feminine lines. Functionally, its light and flowing skirt form offers comfort to the wearer.

Sustainability Connection: The durable brocade fabric used in the dress offers long-lasting use. At the same time, its timeless design and high-quality craftsmanship emphasize long-term value over quick consumption. The combination of different fabrics also contributes to sustainability in terms of waste minimization.

3.4. Design 4

Figure 4 below depicts the second design and the procedure for creating it.

Figure 4

Design 4

Conceptual Framework: This design emphasizes sculptural details within a minimalist elegance. The simplicity of the ecru color makes the dress a timeless piece, while the asymmetrical cut and draping details add dynamism to the figure from different angles. The origami pattern technique used on the sleeves sets the design apart from an ordinary dress, giving it a modern, avant-garde interpretation.

Fabric Type and Technical Applications: The flowing yet shape-retaining structure of crepe fabric provides a suitable base for asymmetrical cuts and draping applications. The origami pattern technique used in the sleeve detail creates geometric curves and three-dimensional volume, while the fabric's firm texture contributes to maintaining this form.

Form, Texture, Volume Analysis: The dress presents a feminine line with its form-fitting shape, while the volumetric folds created using origami techniques on the sleeves create a strong visual contrast. Asymmetrical cup lines and draping applications provide a dynamic flow in the front bodice of the dress, breaking the static form and giving a sense of movement. The simple and sophisticated effect of the ecru color is balanced by the three-dimensional sleeve detail.

Balance Between Aesthetics and Functionality: Aesthetically, the dress represents a fusion of elegant minimalism and avant-garde touches. The origami detail on the sleeves creates a focal point for the viewer, while overall it is more suitable for special occasions or formal settings rather than everyday wear. In terms of functionality, the drape of the crepe fabric provides ease of movement, while the cup details make the figure appear fitter and more balanced.

Sustainability Connection: The ecru color used in the design provides a timeless aesthetic for long-term use. The origami technique and draping require high-quality craftsmanship and pattern solutions, adding artistic value to the dress and offering an alternative to fast-paced fashion. The high-quality crepe fabric offers durability and long-lasting use, thus contributing to a sustainable fashion approach.

3.5. Design 5

Figure 5 below depicts the second design and the procedure for creating it.

Figure 5
Design 5

Conceptual Framework: This design represents an approach that combines modern femininity with sculptural forms. The combination of a transparent bustier and an asymmetrical fishtail skirt offers aesthetic unity through contrast. The transparency and vertical lines created by the piping in the upper part, which emphasize the anatomical contours of the body, and the dramatic drape and slit detail in the lower part, reflect strength and elegance simultaneously.

Fabric Type and Technical Applications: The bustier pattern was worked on a mannequin using a draping method with interfacing. The transparent surface, finished with satin trim, also gains structural integrity with boning placed within channels. This technique stands out as both an aesthetic and functional innovation. The lower part uses black satin fabric to create an asymmetrical mermaid shape, with draping and a deep slit providing movement.

Form, Texture, Volume Analysis: The vertical lines created by the transparent tulle and piping used in the bustier give the body a sculptural structure. Underwire support helps maintain the shape without distortion. The fishtail form of the lower skirt hugs the body, creating an elegant silhouette, while the drapes add volumetric variety. The slit detail provides both aesthetic emphasis and functional comfort.

Balancing Aesthetics and Functionality: From an aesthetic point of view, design, haute couture offers a sophisticated look reminiscent of couture. The sculptural forms in the transparent bustier contrast with the dramatic movement of the underskirt, creating a holistic design language. In terms of functionality, the bustier's boning provides body shaping, while the slit and draping in the skirt allow for ease of movement.

Sustainability Connection: The bustier's high-quality craftsmanship and pattern-making techniques result in a long-lasting and valuable garment. The classic black and white contrast of transparent tulle and satin offers a timeless aesthetic, providing an alternative to fast-paced fashion. Furthermore, the modular two-piece design allows for the individual pieces to be combined, enabling sustainable use.

3.6. Comparison of five designs based on common findings

Each of the five designs developed in the study was analyzed to demonstrate how draping and origami techniques can be integrated into fashion design. The designs were evaluated separately in terms of concept, type of fabric and technique used, form-texture-volume, aesthetics and functionality, and sustainability. The findings from these evaluations reveal the unique characteristics of each design while also highlighting common themes. The table below provides a comparative summary of the analysis findings for each design. This table highlights the similarities and differences between the designs, contributing to a clearer assessment of the overall results of the research.

Table 1

Comparison of five designs based on common findings

Design	Concept	Fabric Type and Technique	Form-Texture-Volume	Aesthetics and Functionality	Sustainability
1. Design (Crepe trousers & organza-brocade blouse)	A powerful female image that blends classic and modern.	Crepe, organza-brocade; origami folding (shoulder and waist detail)	Voluminous arms, origami shoulders; origami accent at the waist.	Elegance and functionality; unique shoulder design.	Timeless fabric selection, long-lasting use.
2. Design (Jacket & Skirt)	A balance between masculine and feminine, a strong female silhouette.	Brocade & cotton combination; origami folding (in the form of jacket shoulders and skirt)	The jacket features stand-up shoulders and a strong form; the skirt has volume thanks to origami-style folding.	Elegant and authoritative appearance; overall team effect.	The fact that the two pieces allow for different combinations reflects the slow fashion approach.
3. Design (Blue satin dress)	Romantic and theatrical stance	Satin and organza-brocade; draping and darting techniques.	Volume added at the shoulders, and darts at the waist and hem.	Feminine aesthetics, elegant functionality.	Timeless form, diverse uses.
4. Design (Ecru crepe dress)	minimalist and modern approach	Crepe fabric; origami sleeve detail, asymmetrical cup, and drape.	The origami sleeve design contrasts with the straight silhouette.	Simple yet original aesthetic, ease of movement.	Durable fabric, classic look.
5. Design (Bustier & fishtail skirt)	Sculptural and sophisticated appearance	Transparent tulle, satin, draping, piping, boning, drape, and slits.	Sculptural bustier, asymmetrical fish form	Haute couture aesthetic, functional slit	Modular design (two parts), durable construction.

4. DISCUSSION

This research developed five different designs based on the combined use of draping and origami techniques in fashion design, and each design was evaluated in terms of originality, aesthetics, functionality, and sustainability. The designs, created using various fabric types such as crepe, brocade, organza, satin, and tulle, demonstrate how both traditional and modern techniques can be adapted to fashion design. The key findings of the research show that draping and origami techniques also hold significant potential in terms of wearability, modularity, and sustainability.

In the history of fashion, especially haute couture, in the couture tradition, origami has been used as an important technique in creating body-hugging, aesthetic, and sculptural forms. Origami, on the other hand, is the adaptation of the Japanese art of folding to the field of textiles and fashion, becoming a valuable method, especially in incorporating volumetric and geometric forms into clothing design. In this research, both techniques have been evaluated separately and together in different garment pieces.

The study revealed that the origami technique is an effective method for creating three-dimensional volume in garments, while the draping technique plays a functional role in achieving sculptural silhouettes that fit the body form. In the first design, origami details create a holistic harmony in the blouse and trousers; in the second design, modularity is achieved through the separate use of the jacket and skirt; in the third design, draping creates a romantic aesthetic; in the fourth design, origami sleeve details add movement to a minimalist structure; and in the fifth design, draping and boning applications give the garment a sculptural quality at the couture level. This diversity demonstrates that origami and draping techniques play a role in providing flexibility and variety in the design process.

When compared with similar studies in the literature, the findings of this study overlap in some points and diverge in others. Niinimäki (2017) states that origami folding techniques serve not only an aesthetic purpose but also a function in reducing fabric waste. In this study, it is similarly seen that the use of origami has both a form-forming and a functional value in terms of sustainability.

Another important aspect of the study is the approach to sustainability in the designs. One of the biggest problems in the fashion industry is rapid consumption and resource waste. Draping and origami techniques, by shaping the fabric on a live or inanimate mannequin and allowing for production that does not require repetition, offer an approach that generates less waste. In addition, the vast majority of the designs possess a timeless aesthetic, supporting modular use and long-lasting garment use through various combinations.

The designs developed in the research demonstrate how the reciprocal relationship between aesthetic appearance and functionality can be balanced in fashion design. Aesthetics reflect the visual appeal of the garment, innovative form explorations, and a unique design language, while functionality is associated with the garment's fit to the body, freedom of movement, ease of use, and durability. In contemporary fashion, the integration of these two dimensions is considered not only a design choice but also a user-centered and sustainable approach.

One example revealed in the research is observed in the fifth design. The shaping of the transparent tulle bustier on the mannequin using draping techniques has given the body an elegant and sophisticated aesthetic. At the same time, the boning placed in the channels created by the piping not only contributed to strengthening the sculptural form but also provided structural durability to the garment. Thus, the design has become more than just a visual spectacle; it has gained a functional structure that can adapt to the wearer's body movements.

A similar approach is seen in the third design, where alternative darts are placed at the waist of the skirt. Here, the aim is to create a voluminous, aesthetic form while functionally ensuring the skirt fits comfortably on the body. This demonstrates that aesthetically pleasing design elements can complement functional qualities rather than conflict with each other. The literature also supports these findings. Fletcher (2013) argues that designs that strike a balance between aesthetics and functionality create a deeper emotional connection with the user, which in turn leads to longer product preservation and reuse. Gwilt (2014), on the other hand, states that aesthetic solutions that functionally support body fitness and comfort of movement are critical for sustainability and longevity in fashion design.

5. CONCLUSION

In conclusion, this research demonstrates that the integration of draping and origami techniques in fashion design offers significant potential for creating garments that are both aesthetically compelling and functionally effective. The five designs developed in this study highlight how these techniques can generate three-dimensional volume, sculptural silhouettes, and modularity, while accommodating different fabric types and design intentions. The findings show that origami contributes to volumetric and geometric form, while draping ensures body-hugging and functional silhouettes, with both techniques working in synergy to enhance wearability and versatility. Moreover, the designs illustrate that innovative aesthetic solutions can coexist with practical functionality, allowing garments to move with the body, fit comfortably, and maintain structural integrity without sacrificing visual appeal.

Beyond form and function, the study emphasizes the role of these techniques in promoting sustainability in fashion. By reducing fabric waste through precise folding and live mannequin shaping, and by producing timeless, modular designs that support long-term use, draping and origami present a strategy for environmentally conscious fashion. The research confirms that balancing aesthetics and functionality not only enriches the user experience but also fosters emotional attachment, prolongs garment life, and encourages mindful consumption. Ultimately, the study provides evidence that combining traditional and modern techniques can create high-value fashion products that respond to user needs while contributing to sustainable design practices.

Conflict of Interest: The authors declare no conflict of interest.

Approval: The study adheres to the ethical guidelines for conducting research.

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