



# Dayak Tribe Talawang Motif as a Variety of Bridal Fashion Decoration with Laser Cutting Technique

Indarti and Asri Setyo Harini

*Department of Fashion Design, Vocational Faculty, Universitas Negeri Surabaya, Lidah Wetan Street, Surabaya*

\*Corresponding author: [indarti@unesa.ac.id](mailto:indarti@unesa.ac.id)

**Abstract.** Talawang is a traditional shield belonging to the Dayak tribe. This research aimed to describe the results of the finished Talawang motif as a wedding dress decoration. The method used a double diamond consisting of 4 stages: discover, define, develop, and deliver. The results of applying the Talawang motif on bridal clothing were analyzed descriptively using the FEA (function, aesthetic, expressive) model. The laser cutting technology could detail the Talawang motif as a modern wedding dress decoration. Making the Talawang motif of the Dayak tribe uses a particular machine for laser cutting using synthetic leather. The bride's clothing follows the design concept using a mermaid silhouette, applying the Talawang motif on the dress and part of the sleeves. The finished men's clothing is under the design concept using a classic formal dress silhouette in a suit consisting of a shirt, vest, trousers, and coat, applying the Talawang motif on the right side of the suit's body. Based on the analysis of the function of the clothing created is a wedding dress, while in terms of aesthetics by applying decorations in the form of stylized Talawang motif with laser cutting techniques. This wedding dress expresses the uniqueness and beauty of the Talawang motif, expressing a modern wedding dress with a touch of local cultural values.

**Keywords:** Fashion design process, double diamond model, FEA model, laser cutting, Talawang shield, Dayak tribe.

## INTRODUCTION

East Kalimantan is a province on the eastern tip of the island of Borneo. East Kalimantan is the fourth lowest population density region in Indonesia. The capital of the province is Samarinda City. Geographically, East Kalimantan has a diverse area, ranging from coastal areas to high mountains. The culture in East Kalimantan is also very diverse, with many different tribes and languages. Some of the tribes that live in East Kalimantan include Dayak, Banjar, Bugis, and Kutai. Each tribe has different traditions and cultures, such as traditional dances, carving arts, and various traditional ceremonies still preserved today. The Dayak tribe is thought to have inhabited Kalimantan more than 2,000 years ago and has a variety of sub-ethnicities scattered in various regions of Kalimantan. The Dayak tribe has a vibrant tradition and culture, with various types of traditional dances, traditional music, and beautiful carving arts (Bayuardi et al., 2017). One of the famous Dayak tribal cultures is the Dayak or Talawang tribal shield.

Dayak people use shields or Talawang in war. This shield is usually made of ironwood. Ironwood (*Eusideroxylon zwagveri*) is a strong and resistant wood to termite and insect attacks and can adapt itself to changes in air temperature, humidity, and seawater, so it is often referred to as ironwood (Syahbani, 2020). Besides as a war tool, Talawang is also a self-protection from wild animal attacks and a protector in case of fire (Febriliani, 2021). This weapon has magical value in its motives that can raise the spirit to strengthen the person who carries it. Talawang carvings have various flora and fauna motif, such as hornbill motif, kamang motif, and fern motif. Talawang is used as a social symbol; it can be seen that the Dayak community establishes a harmonious relationship between nature and humans

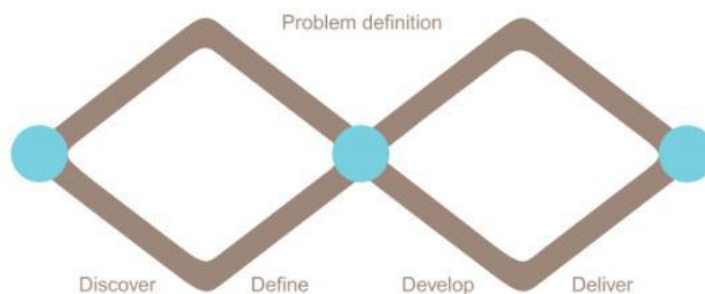
(Syahbani, 2020). Talawang motif can be a source of ideas for fashion and textile works. Culture can play an essential role as an inspirational tool in product design (Barron, 2021).

In previous research that the author has collected, there are three studies on Dayak motif in textile fashion and art. Swastini et al. (2019) created fantasy fashion with the source of traditional Dayak as fashion ideas. Syahbani (2020) made evening dress fashion with the source of the idea of Talawang, with a black base color and decoration with batik techniques. Sari (2017) made batik artwork with the source of the idea of hornbills combining Iban Dayak ornamental varieties. Unlike the previous research, this time, the author wants to research Talawang motif on bridal fashion decorations with laser cutting techniques. Laser cutting is one of the most widely used types of non-contact heat-based processes for cutting materials, such as titanium, stainless steel, and aluminum, as well as non-metallic materials, such as wood, glass, plastic, ceramics, which are used in various fabrication industries (Khatak, 2022). Permatasari & Siagian (2019) makes fashion decorations with laser cutting techniques in the form of edelweiss flowers, which are made into a corsage module that is pasted and mapped into fashion decorations. The shape of the decoration with the laser cutting technique chosen in this study is to remove certain parts so that the fabric looks hollow out according to the design drawn (Rofiah & Suhartini, 2020). The surface with holes is an ornament on the fabric's surface, the primary material for bridal clothing.

Bridal attire is expected to be a special outfit that is only worn once in a lifetime at a wedding. Bridal attire is usually specially designed and different from everyday fashion, using high-quality materials and accessories and decorated with various beautiful decorations and embellishments. The bride's fashion usually consists of luxurious and exquisite long dresses with various embellishments. Meanwhile, the groom's attire usually consists of a suit and pants in a color that matches the bride's outfit. Wedding dress as the identity of the bride and groom should be made more luxurious and unique to be the center of attention on the wedding day (Ervinawati & Maeliah, 2013). Bridal fashion has undergone some changes. Modern bridal attire usually uses a simpler and minimalist design, with a modern touch adapted from current fashion trends. The research aims to describe the application of the Talawang motif of the Dayak tribe as an ornament of bridal clothing.

## METHODS

The method used in this study is the Double Diamond Model, which consists of four stages: discover, define, develop, and deliver (Ledbury, 2017). The four stages are described in **FIGURE 1**. The discovery stage is the designer's initial process of finding inspiration and gathering information; the define stage is the design prioritization stage; the developing stage includes prototype development and testing; and finally, the delivery stage, which is the product completion stage based on data from the development and trial of the prototype. In more detail, the Double Diamond Model described by the author in making groom and female clothing is described in each stage as follows.



**FIGURE 1.** Double diamond model (Ledbury, 2017)

### Stage 1: Discover

The discovery stage is the initial stage of the design process. Designers seek inspiration, gathering information about what is new and exciting through market intelligence, user inquiry, mind mapping, and collaborative research design (Ledbury, 2017). In this stage, researchers try to understand the problem and find design opportunities by

conducting research and observation. This stage aims to thoroughly understand the problem, discover aspects that still need to be seen, and understand the needs of the user. The fashion market created is women aged 23-30 who will hold a wedding.

At this stage, we are looking for references to the source of the idea of the Talawang motif. After several considerations, the author determined the fern motif as the main inspiration. Fern ornaments have a pattern with circular edges that are useful for warding off evil spirits and signifying social status. The next step is applying this fern motif to modern bridal attire. What is done is to determine the theme of the folklore of the origin of Nusa Island from East Kalimantan. The legend tells the story of a man named Nusa who transformed into a dragon and later died from eating his tail. Over time, the skeleton of the Nusa dragon was overgrown with plants to form an island now known as Nusa Island.

From the inspiration for the folklore, the authors collected images of dragons, islands, and various Dayak tribe decorations, namely fern plant motif. The fern motif is the most common motif found in the Dayak tribe, generally applied to regional art properties and traditional houses of the Dayak tribe. This motif symbolizes the eternity of life (Leonaldy et al., 2015)—the colors on the mood board range from white and gray to black gradations (**FIGURE 2**). Mood boards in fashion design consist of a collection of images that express design concepts by telling stories, creating emotions, or making arguments that must further embody visual elements of colors, lines, shapes and shapes, textures, and details that can be translated into clothing design (De Wet, 2017). Although the Dayak tribe uses a lot of bright colors, the creation of this bridal fashion work uses the classic color of bridal clothing; it is white for long dresses.

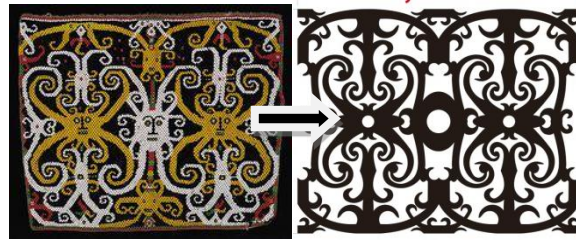


**FIGURE 2.** Moodboard

## Stage 2: Define

In the define stage, the design team tries to formulate a specific problem and figure out how to solve it. This stage involves identifying the core problem and determining the purpose of the design to be carried out. Designers look at the possibilities identified in the discovery phase and establish the most critical priorities and the order in which they are handled. In this stage, researchers identified a core problem: the application of the Dayak tribe's Talawang motif to modern bridal attire. Researchers determined the Talawang motif to be developed. Talawang is the shield of the Dayak tribe made of ironwood. Tameng, or in the Dayak Kenyah language, namely *kelempit*, is a means of self-

defense for the Kenyah Dayak tribe (Andison, 2018). The chosen Talawang motif is the fern motif. The fern motif was redesigned into a more exact shape to become a variety of clothing decorations (FIGURE 3).



**FIGURE 3.** The modification of fern motif on the Dayak tribe's Talawang

The fern motif on the Talawang is applied to the bridal attire as shown in FIGURE 4. The development of bridal fashion design has gone through several stages. The development of fashion silhouettes and the application of Talawang motif have been developed in several designs, then newly selected designs will be realized with some considerations. The selected fashion design in Figure 4 consists of a one-piece long-sleeved dress with a mermaid silhouette for the bride and a suit for the groom. This men's fashion consists of 4 pieces, namely suits, pants, vests, and shirts, as a complement to the clothes, plus a tie to add a neat impression. The chosen bridal fashion style is modern minimalism. This style was chosen following the new normal trend: minimalist, sports, and closed clothing (Putri & Ratih, 2020).



**FIGURE 4.** Selected designs

### **Stage 3: Develop**

The development stage is the prototype creation and evaluation stage (Ledbury, 2017). The third stage is the stage where the team begins to design design design concepts that follow the problem that has been defined. This stage involves ideation and experimentation, where the team generates as many design ideas as possible and evaluates those ideas to achieve the most effective design concept. This ornamental variety of Talawang motif is applied using laser cutting techniques. A laser is a tool that synergizes with digital data processing in the process of cutting materials. This technique can provide accuracy, strength, and cutting speed that cannot be done manually (Nayenggita & Sunarya, 2013). Researchers experimented with a material that is thick and not easily insulated. FIGURE 5 is the

result of experiments using synthetic leather. This material is selected because it meets the criteria desired by designers: thick material, somewhat rigid, and not easily stained. Synthetic leather is a PVC resin material with the addition of additives so that it is stable, has high flexibility, and is abrasion-resistant (Sholeh & Rochani, 2018).



**FIGURE 5.** Result of laser cutting experiments using synthetic leather

At the time of the first trial, the *laser cutting* results became burned on the welded part. The edges of the motif become blackish because the primary material of synthetic leather is white. White color is very susceptible to laser *cutting*, resulting in discoloration due to exposure to laser light. The experiment continued to try again by coating this white synthetic leather with plywood on the bottom before welding. The experiment was successful; the synthetic leather was safe from burning, causing a blackish tint on the edges of the motif. So, to prevent burning, the edges of the welded motif should be sheathed with plywood boards.

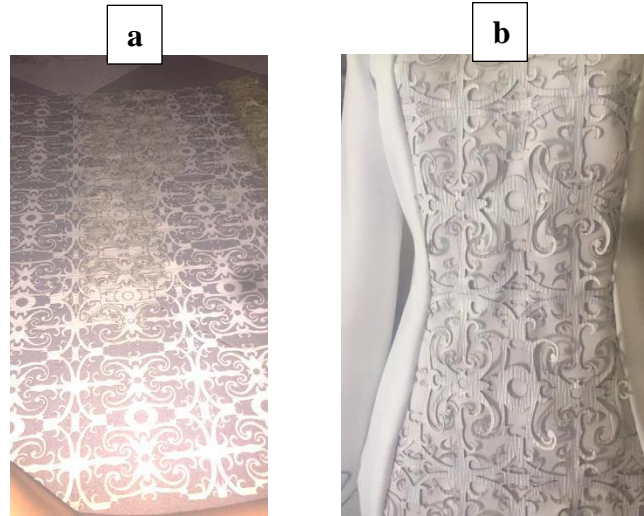
The type of motif that can be cut using a laser must also be considered. At the time of the first trial, the Talawang motif was too complicated and small, resulting in parts that were too small to break easily. The expected motif with this laser cutting is to remove certain parts so that there are holes that make up the motif. These sheets of PVC fabric or synthetic leather are formed with holes like lace fabric. So, it is necessary to pay attention to the distance between the holes so they are manageable because they are easy to break. The synthetic leather material covered in the Talawang motif becomes a fashion decoration, combines with ordinary fabrics, and can be sewn as usual. However, the stitches should not be revised because synthetic leather will imprint a sewing needle.

#### **Stage 4: Deliver**

The final stage is delivery. In this fourth stage, the team begins to implement design concepts into the real solution. The delivery stage includes the application of fern motif to Dayak tribal Talawang with laser cutting techniques on the long dress, the bride's dress, and the groom's dress. Previously, the author made a fashion prototype using muslin fabric and placed an actual size decoration arranged on top of the prototype, then evaluated on the first fitting. After repairs are made, multiply the decoration with laser cutting techniques that will be applied as fashion decorations.

The process of applying the Dayak tribe's Talawang motif to embellish groom and bride dress decorations is carried out with laser cutting techniques. In making the motif this time, the laser machine was chosen to realize the motif that had been made because the motif design was quite complicated and quite a lot, so using the technology of cutting materials using a laser is considered to facilitate and speed up the process of cutting the motif that have been made. In the laser cutting design process, each motif that has been made cannot be printed separately and must be connected and not be too curved. Therefore the modification process of the actual image using the Corel application is carried out so that it meets the criteria for being cut according to the motif. The maximum size for a cutting laser is a design height of 3 m and a width of 1.5 m. The laser cutting process used synthetic leather as the basis. Synthetic leather is chosen because it is sturdy and strong and uses a thin material; it is easy to burn and can simplify the cutting process. The color of the selected fabric is silver, textured, and patterned with the same color. After the laser cutting process, the results are mapped according to the part of the bride's clothing pattern that will be decorated (**FIGURE 6a**).

The cutting process is carried out one by one carefully so that the results are maximum and neat (**FIGURE 6b**). Each motif is placed according to a pattern that will be decorated with a final design that has been made and then embedded with a needle, namely the long dress of the middle face and middle of the back while the man is applied to the right chest. After all the motif are installed, applying the motif that have been laser cut with the hidden sum technique is carried out. The hiding sum technique is carried out so that the thread that holds the primary material together with the cutting laser is not visible. The hiding sum technique is carried out at a distance that is not too far so that the application can blend perfectly with the primary material. While gluing is done beforehand to help the decoration stick to the primary material more firmly and not move quickly when perverted. The final stage is the process of embroidery of sequins. The sequins used are stem sequins. The color of the selected sequins is silver. Sequins are applied to fashion cutting to emphasize the fashion part with plain fabric and the fashion part with laser-cutting decoration.



**FIGURE 6.** Lasser cutting process (a), mapping fabric that has been laser cut (b)

Furthermore, the analysis of fashion products using the FEA model (Function et al.) was carried out. The FEA model was proposed by Lamb & Kallal in 1992 and has been cited hundreds of times by researchers spread across the globe. Orzada & Kallal (2021) assessed the FEA criteria for products targeted to different consumer groups and product types. The findings suggest that the FEA Model has been applied in various conditions to understand consumer needs, inform the design process, ensure model usability, and demonstrate the power and flexibility of the FEA Model. Jang, Lee & Yoo (2021) used the Functional, Expressive, and Aesthetic (FEA) framework to analyze the attitudes of male and female nurses toward Nurse Uniforms in South Korea. Meanwhile, Chae (2022) applies functional, expressive, and aesthetic (FEA) needs to gender differences in adaptive clothing for people with disabilities.

## **RESULTS AND DISCUSSION**

The finished result of the application of the Dayak tribal Talawang motif applied to the long dress of the bride's dress and the groom's suit is shown in Figure 7. The bride's fashion consists of 1 piece in the form of a long dress and four pieces for the groom's clothes: a suit, shirt, vest, and trousers. Based on the design criteria for bridal clothing adopted from the FEA model, the finished results of the clothes are analyzed through 3 kinds of design criteria: functional, expressive, and aesthetic. Based on the FEA model (Jang et al., 2021), including functional (fit, mobility, comfort, protection, wearing), expressive (value, role, status, self-esteem), and aesthetics (art elements, design principles, body/garment relationships). The following is an analysis of the bridal attire results based on these three design criteria.

## Function

Customers may be looking for functional considerations related to usability, for example, protection, thermal comfort, fit, mobility, and safety (Orzada & Kallal, 2021). The finished result of this bridal outfit is inspired by the folklore of the origin of the island of Nusa, located in East Kalimantan, precisely the Dayak tribe, which is famous for its unique Talawang motif. The function of the clothes created is bridal clothing for women and men who will hold weddings. This can be seen from the fashion design that is made elegant with a mermaid silhouette with a Talawang motif from laser cutting combined with sequins to add a luxurious impression to the bride's outfit. In contrast, men's clothing is made as harmonious as possible with the bride's clothes. Although the typical colors of the Dayak tribe are actually yellow, red, blue, and black, this collection uses classic colors, namely white as the bride's clothing and dark gray for the groom's clothes. The fabric used for long dresses is duchess fabric. Duchess fabric has a relatively thick texture, so it is balanced when combined with synthetic leather, and Duchess fabric has a shiny surface suitable for bridal attire. The bridal fashion created is simple and modern; white is an option. White is the traditional color of Western brides (Arumsari, 2012). The complement of clothing is in the form of a hairpiece for the bride and a tie for the groom as a typical complement to Western bridal attire.

## Expressive

Expressive considerations concern the communicative and symbolic aspects of clothing in a social context (Orzada & Kallal, 2021). Clothing communicates a variety of messages that give gestures of appearance about the wearer. Viewers interpret these cues and clothing items using various cultural perspectives. Aesthetic demands result from man's desire for beauty in the context of one's cultural standards. The finished result of this bridal outfit, as shown in **FIGURE 7**, is the result of the uniqueness and beauty of the Talawang motif of the Dayak tribe in East Kalimantan. The finished product of this fashion can express modern bridal fashion with a touch of local cultural values. Modern bridal fashion with a simple style can be an option for brides-to-be who like a simple concept. The selection of a variety of decorations typical of the Dayak tribe, which is one of the cultural treasures of Indonesia, can be used as an alternative decoration for bridal clothing. Consumers of this bridal fashion can be people from Kalimantan or anyone who admires the beauty of Indonesian culture. The selection of local culture in modern fashion helps preserve and shape cultural identity in today's global era. Cultural identity contributes to creating symbols, meanings, and cultural norms of its group, specifically and generally (Iskandar, 2004).



**FIGURE 7.** A pair of bridal attire with laser cutting embellishment

## Aesthetic

Bridal attire that is made is decorated so that its aesthetic value increases. Aesthetic factors contain visual appeal that considers using colors, shapes, materials, and all things that can be seen visually (Marpaung & Nur, 2018). The decoration is in the form of the distillation of fern motif on the Dayak tribe's Talawang. The motif is applied with a laser cutting technique. The application of Talawang motif as a decoration on the middle of the face and back of the women's long dress, while for men, it is applied to the right chest suit. The details located in the dress and suit are visible. Talawang motif with laser cutting technique forms a texture on bridal attire. Synthetic leather material is thicker than holes according to the design of the Talawang motif to form a thin, thick texture on the fashion material. The application of various ornamental flora, namely fern plants, is modified by making the motif more decorative to adjust the results to the cutting technique and the fashion design. Applying the ornamental variety aims to add aesthetic value to bridal fashion products. As in previous research, fashion design analysis can use design principles (Anggarini & Indari, 2022). The design principle is applied in placing ornamental varieties of laser cutting. The principle of symmetrical balance is applied to the bride's clothing, while the asymmetrical balance is applied to the groom's clothing, where the placement of laser-cutting decorations only on the right chest is also the center of interest. Unity and rhythm are applied with the repetition of laser-cutting motif on the body, arms, and men's clothing. The design principle becomes a means by which designers can adjust the focus and effect of the design product. Aesthetic considerations are related to the human desire for beauty in art objects, including clothing.

## CONCLUSION

The results of the bride's attire in accordance with the design concept include using a mermaid silhouette and a laser cutting technique of the Dayak tribe's Talawang motif applied to the dress and part of the arm. The men's clothing follows the design concept, using a classic formal fashion silhouette in a suit consisting of a shirt, vest, trousers, and a suit. Applying the Talawang motif laser cutting technique of Dayak tribes on the right side of the suit body. The results of applying the Talawang motif to bridal attire were analyzed descriptively using the FEA model (function, expressive, aesthetic). The function of the clothes created is bridal clothing for men and women who will hold a wedding with a modern minimalist style. The use of duchess material is quite suitable for bridal attire because it has a shiny surface. In expression, this bridal dress illustrates the uniqueness and beauty of the Dayak tribe's Talawang motif, which expresses modern bridal fashion with a touch of local cultural values. The aesthetics of bridal fashion is applied by giving bridal fashion decoration in the form of the stylization of Talawang motif with laser cutting techniques that give a unique texture to the clothes. The application of several design principles has been carried out to provide aesthetic value to bridal attire.

The material used for the bride's fashion is duchess fabric because it is relatively thick, strong, and not easily wrinkled. In contrast, synthetic leather is the primary material for decoration that uses laser cutting. White color is very susceptible to discoloration due to the laser cutting process. Along the motive will be blackish the Akiba burns. White should be avoided. The solution is using white synthetic leather, then applying a plywood board base before the laser is highly recommended to avoid blackish color due to burning. Choosing a motif for laser cutting by removing part of the motif to make it look like holes like lace must be considered. It is recommended that the motif should not be too small, and the distance of the motif should also not be too close because the motif can be cut off. Too thin and small in shape, there is a risk of failure during laser cutting. The primary process is the stylization of the Talawang motif by simplifying its shape and eliminating small shapes.



## REFERENCES

1. Andison, R. (2018). *Stilasi Tameng Dayak Kenyah* (Doctoral dissertation, Institut Seni Indonesia Yogyakarta).
2. Anggraeni, D. N., & Indarti, I. (2022). Visualisasi Naga Erau pada Hiasan Busana Pengantin Wanita Muslim. *TEKNOBUGA: Jurnal Teknologi Busana dan Boga*, 10(2), 131-139.
3. Arumsari, A. (2012). Pengaruh Globalisasi pada Desain Busana Pengantin Wanita di Indonesia. *Jurnal Seni Rupa & Desain*, 3(1), 23-33.
4. Bayuardi, G., Firmansyah, A., & Superman, S. (2017). Fragmentasi, Sejarah, Heterogenitas Penduduk, dan Budaya Kota Pontianak. *Patra Widya: Seri Penerbitan Penelitian Sejarah dan Budaya.*, 18(3), 283-293.
5. Barron, L. (2021). The creative influence of history in fashion practice: The legacy of the silk road and Chinese-inspired culture-led design. *Fashion Practice*, 13(2), 275-295.
6. Chae, M. (2022). Gender differences in adaptive clothing: applying functional, expressive, and aesthetic (FEA) needs of people with movement impairments. *International Journal of Fashion Design, Technology and Education*, 15(3), 360-370.
7. De Wet, A. J. C. (2017). An educational tool to encourage higher level thinking skills in the selection of images for fashion design mood boards: an action research approach. *International Journal of Fashion Design, Technology and Education*, 10(1), 16-25.
8. Erwinawati, Y., & Maeliah, M. (2013). Busana Pengantin Barat dengan Hiasan Teknik Melipat. *Fesyen Perspektif*, 1(1).
9. Febriliani, R. T. (2021). *Pergeseran Nilai Guna Perisai Suku Dayak Kalimantan Timur dalam Penyutradaraan Film Dokumenter " Talawang" dengan Gaya Interaktif* (Doctoral dissertation, Institut Seni Indonesia Yogyakarta).
10. Iskandar, D. (2004). Identitas budaya dalam komunikasi antar-budaya: Kasus etnik madura dan etnik Dayak. *Jurnal masyarakat dan budaya*, 6(2), 119-140.
11. Jang, S. M., Lee, S. E., & Yoo, J. J. (2021). Analysis of male and female nurses' attitudes toward nurse uniforms in South Korea: The functional, expressive, and aesthetic (FEA) framework. *International Journal of Costume and Fashion*, 21(1), 25-37.
12. Khatak, P. (2022). Laser cutting technique: A literature review. *Materials Today: Proceedings*, 56, 2484-2489.
13. Ledbury, J. (2017). Design and product development in high-performance apparel. In *High-Performance Apparel: Materials, Development, and Applications*.
14. Leonaldy, L., Ismunandar, I., & Fretisari, I. (2015). *Motif Dayak* (Doctoral dissertation, Tanjungpura University).
15. Marpaung, J. V., & Nur, S. M. (2018). Pemodelan Estetika Motif Ulos Ragi Hotang Batak Toba Sebagai Aplikasi Media Dekoratif. *Jurnal Rekarupa*, 5(1).
16. Nayenggita, L., & Sunarya, Y. Y. (2013). *Eksplorasi Teknik Laser Cut Pada Ragam Hias Batik Sebagai Produk Fashion* (Doctoral dissertation, Bandung Institute of Technology).
17. Orzada, B. T., & Kallal, M. J. (2021). FEA consumer needs model: 25 years later. *Clothing and Textiles Research Journal*, 39(1), 24-38.
18. Permatasari, R. E., & Siagian, M. C. A. (2019). Pengaplikasian Teknik Laser Cut sebagai Embellishment pada Modest Wear. *eProceedings of Art & Design*, 6(3).
19. Putri, G. E., & Ratih, A. E. (2020). Tren Busana Di Era New Normal: Literature Review. *Prosiding Pendidikan Teknik Boga Busana*, 15(1).
20. Rofiah, L. A., & Suhartini, R. (2020). Pengembangan Desain Motif Batik Kawung Dengan Teknik Laser Cutting Pada Cardigan. *Jurnal Tata Busana*, 9(2).
21. Sari, I. L. (2017). *Transformasi Bentuk Burung Enggang Dikombinasikan Dengan Ragam Hias Dayak Iban Pada Karya Seni Batik* (Doctoral dissertation, Institut Seni Indonesia Yogyakarta).
22. Sholeh, M., & Rochani, S. (2018). Pengaruh pemlastis dioktil ftalat terhadap sifat fisis dan mekanis kulit sintetis. *Jurnal Litbang Industri*, 8(1), 17-22.
23. Swastini, K. O., Sudirtha, I. G., & Widiartini, K. (2019). Pengembangan Busana Fantasi Dengan Sumber Ide Busana Tradisional Dayak. *Jurnal BOSAPARIS: Pendidikan Kesejahteraan Keluarga*, 10(2), 116-125.
24. Syahbani, M. S. (2020). TALAWANG. *Canthing*, 6(1).