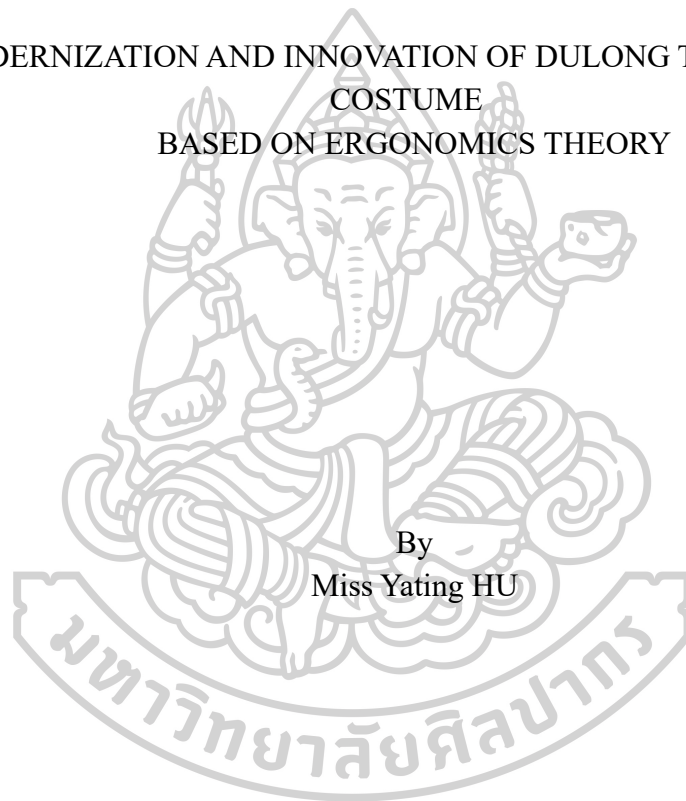




MODERNIZATION AND INNOVATION OF DULONG TRADITIONAL  
COSTUME  
BASED ON ERGONOMICS THEORY



A Thesis Submitted in Partial Fulfillment of the Requirements  
for Master of Fine Arts Design  
Silpakorn University  
Academic Year 2023  
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นวัตกรรมการสมัยใหม่ของเสื้อผ้าแบบดั้งเดิมของ **Dulong** ตามทฤษฎีการยศาสตร์



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรศิลปมหาบัณฑิต

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Miss Yating HU

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Title                    MODERNIZATION AND INNOVATION OF DULONG  
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By                        Miss Yating HU  
Field of Study        Design  
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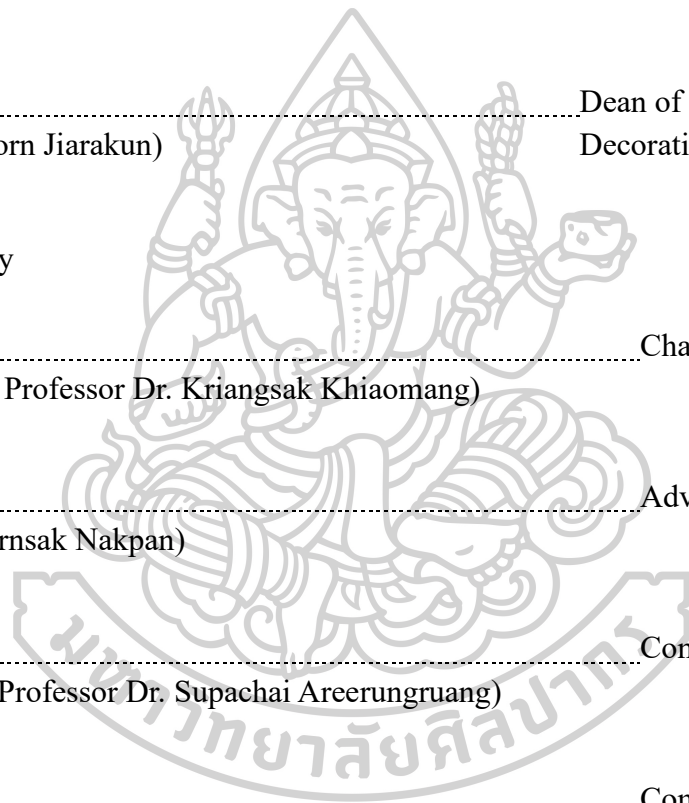
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Keyword : Dulong dress structure; Dulong dress wearing Table; ergonomic theory; CLO3D evaluation

Miss Yating HU : MODERNIZATION AND INNOVATION OF DULONG TRADITIONAL COSTUME BASED ON ERGONOMICS THEORY Thesis advisor : Dr. Khajornsak Nakpan

The Dulong are the smallest ethnic minority among the 26 indigenous ethnic groups in Yunnan Province. They do not have their own writing system, and their cultural inheritance mainly relies on simple family and social activities “passed on by word of mouth.” After founding New China, the Dulong people adopted Han Chinese clothing and gradually abandoned their traditional attire. As a result, Dulong traditional costumes and culture are on the verge of extinction. This paper conducts an in-depth study on how to alleviate and prevent the extinction of Dulong traditional culture and costumes. It first explores the Dulong traditional culture and costumes. It finds that the Dulong traditional clothing structure and styles are outdated and no longer meet the needs of modern society for daily travel and work. Their traditional clothing is often uncomfortable and inconvenient to wear.

This study collects graphic and textual data related to Dulong traditional costumes through a literature review and empirical research methods, including interviews and questionnaires, to gather data and opinions from the target population. The research focuses on three aspects of Dulong blankets: material technology, color, and structural contour. The aim is to analyze the artistic characteristics of the Dulong traditional clothing process, including its craftsmanship, clothing structure, and styles. The structure and styles of Dulong blankets align with the characteristics of “one-piece” and unstructured garments. The “one-piece” garment structure has been significant throughout human history and garment development. Chapter 4 of this study briefly analyzes and organizes the design methods of “one-piece” clothing structures across different periods and cultures, examining the garment-making techniques designers use in “one-piece” clothing production.

Using ergonomics as a guiding principle, this study explores the critical factors of clothing structure in the life and work of Dulong women. It conducts a questionnaire and statistical analysis of young and Dulong women’s clothing appearance preferences. The findings from the research on Dulong traditional clothing are used to design innovative garments that incorporate Dulong traditional clothing structure and expression characteristics. Four garment prototypes are developed and adjusted based on 3D effects, and four human body evaluation postures are determined. These postures are assessed from four dimensions: garment perspective,

garment pressure contact points, garment stress points, and overall evaluation. The best designs are selected for garment production based on the evaluation results.

The result of this research and design process is an innovative design that fits the body shape of Dulong women, meets their daily activity and work needs, and retains the authenticity and characteristics of Dulong traditional dress culture. Ethnic costumes are essential reference materials for modern design, and modern costume design theories provide theoretical support for the innovation of ethnic costumes. This paper proposes integrating contemporary science and technology with traditional culture to develop Dulong traditional costumes and better preserve the traditional culture of the Dulong ethnic group.





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Yating HU

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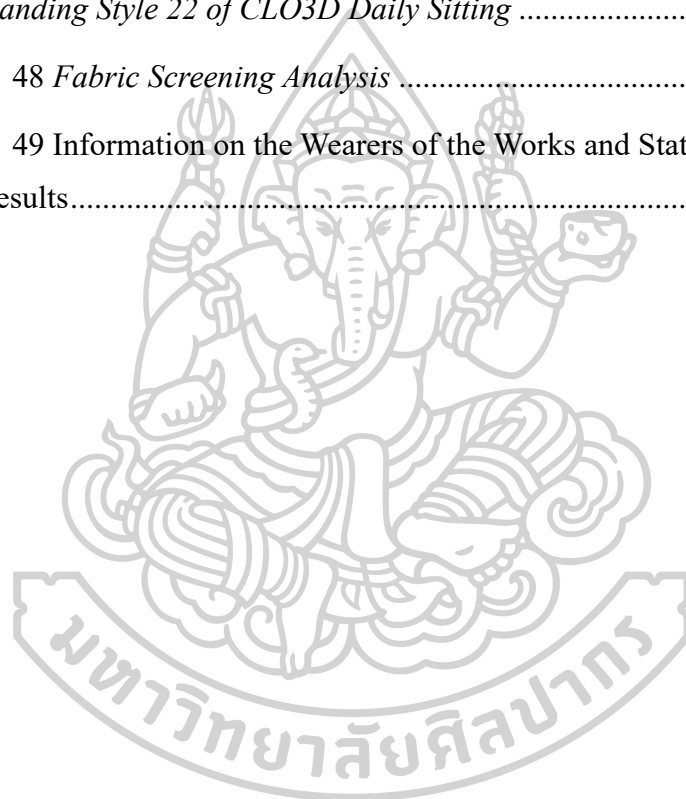
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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1. BACKGROUND OF THE STUDY**

#### **1.1.1 GEOGRAPHICAL LOCATION AND POPULATION SIZE OF THE DULONG**

The Dulong people live in remote and backward mountain villages in Yunnan. Their prominent living place is in the valley of the Dulong River in Gongshan Dulong Nu Autonomous County in northwestern Yunnan. Some live in Fugong and Vixi counties on both sides of the Nu River, in remote locations with closed transportation. People's life patterns partly retain primitive traces.

In 2001, the State Council, for the first time, explicitly mentioned the concept of "less populated ethnic groups." The Dulong is one of the "less populated ethnic groups" in China. Among the 26 indigenous ethnic groups in Yunnan Province, the Dulong is the ethnic group with the smallest population. After the founding of New China in 1949, the total population of the Dulong was less than 1,800 as of the first census of the Dulong population in 1951. The total population of the Dulong is less than 1,000, and the total population is 73, according to the latest census. According to the latest survey, the total population of the Dulong is less than 1,800, and according to the updated population data in the 2021 China Statistical Yearbook, the total population of the Dulong is also less than 10,000, with a total population of 7,310, of which 3,562 are males and 3,748 are females.

#### **1.1.2 PROTECTION OF DULONG TRADITIONAL CULTURE**

The Dulong, as one of the nine "straight-through ethnic groups," transitioned directly from a primitive society to a socialist society in the early years of the founding of New China, realizing the first "historic leap" from the end of primitive society to socialist relations of production. At the same time, it is essential to explore Dulong's cultural inheritance and protection in terms of economic and technological development. For the safety of the traditional culture of the Dulong people, the state put forward relevant policies a long time ago; for example, in 2006, the first batch of the intangible cultural heritage protection list of Yunnan Province listed Dulongjiang Township as one of the 27 traditional culture protection zones, and named it as "Dulong Traditional Culture Protection Zone." Before the founding of New China, the Dulong people were very primitive and backward in their life, economy, and transportation, and hardly ever contacted or communicated with the world outside the

Dulong River, so it was challenging to collect and organize the traditional culture of the Dulong people into a unified book. The rate of cultural loss was rapid.

### **1.1.3 POLICY ON THE PROTECTION OF DULONG TRADITIONAL COSTUMES**

the Chinese government has made a clear commitment since 2017 to launch initiatives to promote preserving and disseminating ethnic minority cultures and their distinctive traditional costumes. Implementing projects such as the China Festival and the Ceremonial Dress Program has resulted in designing and producing a series of costumes that showcase the unique cultural charms of the Chinese nation.

Self-woven hemp cloth has been the only source of clothing for the Dulong people. The blankets are draped over the body, wrapped around the left and right, and the hemp blankets are close to the body as if they were a well-fitting garment. After the founding of New China, Han Chinese costumes were introduced to the Dulong people, and the most noticeable changes took place in the costumes of the Dulong people. The clothes and decorations of the Dulong people gradually began to be “Sinicized” and, even later on, the same as the Han Chinese attire, except for some old people who still retain the traditional attire of the dress, i.e., in the outermost part of the clothes they wear to entwine and drape a Dulong blanket. The Dulong carpet also fully demonstrates the aesthetic concept, unique cultural connotation, and characteristics of the Dulong people. It is also a unique handicraft of the Dulong people, which is an essential symbol of the Dulong people’s clothing. On December 27, 2022, the Dulong carpet production technology was selected as one of the fifth batch of provincial intangible cultural heritage representative projects listed in Yunnan Province.

With the rapid development of the Internet and tourism, the Dulong people have been exposed to a rich variety of costumes other than the traditional Dulong costume, breaking the monotony of the past. In addition, industrialization and urbanization have exposed the Dulong culture to more and more foreign cultural influences. As a result, they have gradually given up their long-standing habit of wearing Dulong costumes, and the Dulong are facing the major problem o

Ethnic costumes are vivid examples of the inheritance and development of ethnic cultures, reflecting their people’s aesthetic concepts and lifestyles throughout history and losing their traditional costume culture. As one of the oldest surviving ethnic minority costumes in China, the Dulong costume culture resources have flowed out in large quantities in the process of modern social development, resulting in a drastic reduction of the cultural resources within the ethnic group and the value of the costume has been dramatically damaged, which warrants the adoption of specific measures to protect and pass on to the Dulong people.

#### **1.1.4 THE MEANING OF MODERNIZATION AND INNOVATION OF DULONG TRADITIONAL COSTUMES**

Before the founding of New China, the Dulong people had not made good contact with the outside world because of the geographical reasons of their living and settlement. The Dulong people's way of dressing and clothing materials were kept in primitive styles, and it was recorded in the historical materials that the Dulong people generally wore cotton clothes after 1950 (Wang, 2017); among the traditional costumes of the Dulong people, the most representative is the Dulong blanket, the structure and wearing style of which have traces of the primitive social period and are preserved to this day with unique artistic and cultural value. Among the traditional costumes of the Dulong, the most representative one is the Dulong carpet, whose structure and way of wearing have traces of the primitive society period and which has been preserved to this day with unique artistic and cultural value.

The creative inheritance and innovative development of Dulong traditional costumes face significant challenges in contemporary society. Based on the investigation and research on the living environment, cultural beliefs, and traditional costumes of the Dulong people, the Dulong people's respect for mainstream culture under the impact of modern culture is one of the main reasons for the decline of the Dulong traditional costume culture (Wang, Fan, and Jia, 2017), which leads to the lag in the development of the structure of the Dulong traditional costume and the Table of wearing it. The Dulong conventional costumes, including the Dulong costumes after "Sinicization," are not suitable for today's social life. The styles of Dulong costumes and the Tables of wearing them are not ideal for the shape of the human body. They cannot meet the demands of daily life activities, nor are they suitable to the present aesthetic preferences and dress requirements. Therefore, given the current situation of the Dulong traditional costumes, first of all, we must strengthen the sense of national identity of the Dulong people and explore and study the main features of the Dulong traditional costumes; on the other hand, the innovation of the Dulong costume culture needs to take inspiration and reference from the method of clothing structure design and the expression of unstructured clothing in the modern society, to translate the stereotyped shortcomings of the traditional costumes. Only by reacting to the trends of the times can we genuinely promote the inheritance and development of minority dress culture and prevent the loss of the traditional culture of the Dulong people.

How to ensure the structure and style of Dulong clothing while maintaining the comfort of clothing requires ergonomic intervention; this study will be on the Dulong traditional clothing structure and Table of innovative design research in the process of the creative design of Dulong clothing, on the clothing ergonomics theory of learning, the ergonomics of the better use of the "one-piece" structure, as far as possible to maximize both for the human body's daily activities and comfort and in line with the

current social aesthetic concepts. One-piece” structure, as far as possible, maximizes the human body’s daily activities, achieves comfort, and aligns with the current social and aesthetic concepts. To a certain extent, this can make up for the problems encountered in the inheritance of Dulong clothing and solve the inconvenience caused by the Dulong traditional clothing to the Dulong people in their daily lives. The development of 3D printing, seamless clothing, virtual fitting, and other technologies provides more favorable conditions for studying clothing structure. This study requires the use of CLO3D software to test the experimental clothing styles of this study, and the virtual fitting function of the model of the CLO3D software is convenient in this study because of its effectiveness, simplicity, and cost savings.

In conclusion, the “modernization” in the modernization and innovation of Dulong traditional costumes is to preserve the characteristics of Dulong traditional costumes, improve the traditional costumes of the Dulong people that have survived the primitive society, and make use of modern tailoring technology and clothing design techniques to innovate Dulong conventional clothing styles, learn ergonomics, and use CLO3D digital virtual testing of clothing styles to adapt to the aesthetics of modern society and the pressure of human body dynamics, and other means to solve the problem. To solve the problem of adapting clothing styles to the aesthetics of modern society and adapting clothing styles to the dynamic comfort of the human body, we use modern tailoring technology and clothing design techniques to innovate the traditional clothing styles of the Dulong ethnic group, study ergonomics, and use the pressure of CLO3D to digitally and virtually test the clothing styles to solve the problem of adapting clothing styles to the aesthetics of modern society and adapting clothing styles to the dynamic comfort of the human body. In the end, Dulong women and people who like Dulong traditional costumes can wear Dulong conventional costumes in their daily lives and at work, and the shortcomings of the Dulong traditional costumes from primitive society will be gradually transformed into modernized costumes.

#### **1.1.5 CULTURAL SENSITIVITY AND APPROPRIATENESS IN MODERNIZING TRADITIONAL COSTUMES**

In the pursuit of modernizing traditional costumes of the Dulong ethnic group, a deep respect for cultural heritage must be maintained while adapting elements to contemporary tastes and lifestyles. This section emphasizes the preservation and adaptation of cultural elements in the process of modernization, detailing how specific design aspects are preserved and how the new design draws inspiration from traditional motifs, ensuring a harmonious blend of modern appeal and cultural authenticity.

##### **(1) Preservation of Cultural Elements**

The modernization process must delicately preserve the core cultural elements that define Dulong traditional costumes. This includes the iconic "one-piece" construction, which is more than a garment; it is a narrative of social evolution and a symbol of cultural resilience. The preservation of such elements is not merely about maintaining tradition but also about ensuring that the costumes remain a living testament to the Dulong people's history and identity.

#### (2) Adaptation of Traditional Motifs

New designs should be inspired by traditional motifs, reinterpreting them in a way that resonates with modern aesthetics. For instance, the use of traditional patterns and symbols can be adapted into new forms and applications, such as incorporating them into modern silhouettes or using them as design accents on contemporary garments. This approach allows for the evolution of traditional costumes while still honoring their origins.

#### (3) Balancing Modern Appeal and Cultural Authenticity

Striking a balance between modern design sensibilities and the authenticity of cultural heritage is crucial. Modernization should not come at the expense of the costumes' cultural significance. Instead, it should enhance the traditional costumes' relevance in today's world. This balance can be achieved by integrating modern materials and techniques that complement, rather than overshadow, the traditional aspects of the costumes.

#### (4) Design Elements Retained

Specific design elements such as the unique weaving techniques, color palettes, and the use of natural fibers will be retained. These elements are not only distinctive to Dulong traditional costumes but also carry deep cultural meanings. The modernization will focus on enhancing these features, making them more accessible while ensuring their cultural significance is upheld.

#### (5) Inspiration from Traditional Motifs

The modern designs will be inspired by the rich tapestry of traditional motifs, which could include geometric patterns, animal symbols, and nature-inspired elements. These motifs will be abstracted or directly incorporated into the new designs, ensuring that the costumes remain a visual representation of Dulong culture.

#### (6) Maintaining Cultural Authenticity

Throughout the modernization process, it is imperative to maintain cultural authenticity by engaging with the Dulong community, understanding their values, and respecting their customs. The designs should be created in collaboration with the community, ensuring that the modernized costumes are not only aesthetically pleasing but also carry the community's approval and support.

In conclusion, the modernization of Dulong traditional costumes is a complex process that requires a deep understanding of cultural sensitivity and appropriateness. By focusing on the preservation of cultural elements, adapting traditional motifs, and



balancing modern appeal with cultural authenticity, the revised section aims to create innovative designs that are both respectful of the past and relevant to the present. This approach will ensure that the Dulong traditional costumes continue to be a proud emblem of the Dulong people's heritage, adapting gracefully to the changing times.

## **1.2 PURPOSE AND SIGNIFICANCE OF THE STUDY**

### **1.2.1 RESEARCH PURPOSE**

- (1) To stop the extinction of the traditional dress culture of the Dulong people.
- (2) To adapt the structure and style of Dulong clothing to the aesthetics of modern society.
- (3) To make the structure and style of Dulong traditional clothing conform to the human Table and meet the needs of daily activities.

### **1.2.2 RESEARCH SIGNIFICANCE**

- (1) Theoretical significance

As we all know, China is a country with five thousand years of cultural history and also a country with fifty-six different nationalities and cultural characteristics. Zhou Ping had a similar expression in his 2010 Re-conceptualization of the Nation-State, that the Chinese nation is a combination of all the nationalities of China, and that all the nationalities, in the process of mutual exchanges and development, have gradually labeled a political community with a multi-ethnic state as the main part of it, thus nurturing a nation-state (Zhou, 2019). The connotation of the Chinese national community is extremely rich, in which national identity is emphasized, and the Dulong, as a typical ethnic group that lacks a sense of identity of its own ethnic group, enhancing the Dulong national cultural identity is a major problem facing the Dulong and the society nowadays (Yang, 2016). The types of religious beliefs and living standards of each ethnic group are more reflected in the different dress cultures of each ethnic group, and dress is an important expression of folk culture. Dulong is no exception; from the evolution of Dulong's dress, we can see the development of Dulong's folklore and culture. Dulong's dress, in the process of long-term development and evolution, not only labeled its own distinctive characteristics and was given a certain social function but also accumulated a response to the Dulong's history and customs of the rich cultural connotations. In-depth study of the traditional costumes of the Dulong ethnic group and these rich and heavy historical emotions and our traditional culture are better integrated into contemporary fashion design so as to achieve continuous innovation, development, and promotion on the basis of inheriting the traditional Chinese culture and costumes.

This time, I will combine the Dulong traditional dress culture with modern fashion design thinking and design methods, production technology, and modern

fabrics, and at the same time, integrate the aesthetics of contemporary society and the spirit of innovation so as to practice and innovate, so as to increase the Dulong people's sense of identification with their own culture, and improve the status and importance of Dulong dress in society. The rich historical background, combined with the new era of subject knowledge and design methods, actively innovate and promote the traditional culture of the Dulong ethnic group and costumes, increase the ways and means of publicizing and promoting the traditional Chinese ethnic culture, so that the traditional Chinese culture can be effectively inherited and developed.

## (2) Relevance

The study explores the characteristics and cultural and artistic connotations of the traditional costumes of the Dulong ethnic group and finds that the main reasons for their demise include the Dulong people's low sense of identity with their own culture, the simplicity of the traditional costume structure, the lagging behind in the development of the costume structure and the Table of clothing, which leads to the fact that the Dulong traditional costumes are not suitable for the Dulong people to wear in the modern society. This paper focuses on how to improve the obsolete shortcomings of the Dulong traditional costumes and let the disappearing costume culture return to society, so as to enhance the Dulong people's sense of identity with their own culture, as well as to improve the status of Dulong culture and costumes in the development of modern society. The Dulong traditional costumes are simple in structure and changeable on the Table, but they are not suitable for daily travel in modern society. To improve the Dulong traditional costumes, we need to know more about the traditional costumes of Dulong before designing and producing, including patterns, colors, fabrics, wearing styles and crafts, etc. We need to summarize the traditional costumes that can express the Dulong culture and culture, so as to enhance the status of Dulong culture and costumes in the development of modern society. Before designing and producing, we should know more about the traditional costumes of the Dulong people, including patterns, colors, fabrics, styles and crafts, etc. We should summarize the costume elements and dressing styles that can express the cultural characteristics of the Dulong people, draw on the design methods of modern structures and clothing expressions, and apply the colors, line elements, and wearing styles of the Dulong blankets to modern fashion design, study the ergonomics of the clothing, and design and produce the Dulong costumes that suitable to the shape of the human body and satisfy the needs of daily life activities. To solve the existing problems of the Dulong traditional costumes, so that the disappeared Dulong traditional costumes can return and people can really travel in the costumes with the characteristics of the Dulong traditional costumes.

### 1.3 RESEARCH HYPOTHESIS

After the founding of New China, with the development of the times, the Dulong ethnic group in the acceptance of the “Han culture” at the same time, and other ethnic minorities unique customs and culture, the traditional culture of this ethnic group have suffered from the impact of the Dulong ethnic group’s unique clothing culture is also declining (Wang, 2017). The traditional Dulong clothing has a simple structure and varied Tables of wearing, but the overall style of clothing structure cannot meet the aesthetic concepts of people in modern society and traveling, and the clothing does not fit the human body when wearing. Aiming at the above two problems of Dulong traditional costumes, combined with the current social development, this paper puts forward the following research hypotheses:

Research hypothesis 1: One of the reasons why the Dulong traditional costumes have been forgotten and abandoned by the Dulong people and the society is that the structure and style of the Dulong traditional costumes are so simple that they cannot satisfy the needs of the people in the course of the development of the modern society in terms of aesthetics and function. Therefore, it is necessary to improve the backward structure and wear the Table of Dulong traditional costumes. Based on the exploration and research on Dulong traditional costumes in the early part of this article, it is concluded that the structure of Dulong traditional costumes is based on the “one-piece” Dulong carpet, and the “one-piece” clothing structure is endowed with different cultures in different periods. Different periods have given different cultural connotations to the “one-piece” clothing structure, and the many explorations of the “one-piece” structure have also provided a reference for the development of clothing structure and clothing aesthetics. In this study, the author will summarize the design methods in the development process of the “one-piece” structure, draw on the “one-piece” structure design methods suitable for the aesthetics of the modern society and in line with the concept of the development of the modern society, and carry out structural design improvement experiments on the traditional clothing structure of the Dulong ethnic group. Experiment on the structural design improvement of the Dulong traditional costume structure.

Research hypothesis two: the second reason why the Dulong traditional costumes are forgotten and abandoned by the Dulong people and the society is that the Dulong traditional costumes are worn in a variety of ways, but due to the lagging behind the development of the costume design, the “advantage” of the Dulong traditional costumes of “wearing multiple clothes” has turned into a “disadvantage”, and the Dulong people no longer wear the Dulong costumes which are difficult to move in life. However, due to the lag in the development of clothing design, the “advantage” of “wearing multiple garments” of the Dulong traditional clothing has become a “disadvantage”, and the Dulong people are no longer wearing Dulong clothing which is not easy for them to move around in their life, and the Dulong people’s clothing

expression in this way is similar to the “unstructured Table of clothing” in the modern life in a number of coincidental ways. In this study, the author will summarize the expression of “unstructured clothing” in the process of historical development, and draw on the expression of “unstructured clothing” which is suitable for the aesthetics of modern society and in line with the development concept of modern society, and then make a costume study on the expression of traditional clothing of the Dulong ethnic group. The experiment of designing and improving the expression of traditional costumes of the Dulong people.

Research hypothesis 3: The third reason why Dulong traditional costumes are forgotten and abandoned by Dulong people and society is that the structure and style of Dulong traditional costumes do not fit the human body, which affects the daily life actions and also the wearing experience, in this research, the author will study the theory of “ergonomics” and extract the factors that affect the clothing of human body parts. In this study, the author will study the theory of “ergonomics”, extract the factors that affect the clothing of human body parts, and use CLO3D to evaluate the experimented clothing styles by virtual modeling during the experiments on the clothing structure and the clothing expression, and finally choose the three clothing styles that have the best evaluation results for the ready-made clothing production.

#### **1.4 EXPECTED RETURN**

This article is based on the study of Dulong traditional dress culture, focusing on the Dulong traditional dress production technology, color, clothing structure and clothing wear Table to explore, in line with the relevant documents issued by the state and the development needs of the times, the modern clothing design methods and clothing expression methods and traditional ethnic culture fusion design research, combined with the “Ergonomics Combined with the theory of “ergonomics” and the use of CLO3D to evaluate the experimental styles of this research, we can solve the shortcomings of the traditional clothing of the Dulong people from the fundamental reasons, and can innovatively design the clothing that retains the characteristics of the traditional clothing of the Dulong people, and suitable to the shape of the human body as well as meets the needs of daily life and sports, so as to make the Dulong people deepen the understanding of the culture of this ethnic group and to enhance the sense of identity of the Dulong people. The program will enable the Dulong people to deepen their understanding of their culture and enhance their national identity. This has enabled the Dulong people to deepen their understanding of their own culture and strengthen their sense of national identity and has made them close to the life of the Dulong people, which has fundamentally impeded the major phenomenon of the loss and extinction of the Dulong traditional dress culture. The return of the traditional costumes of the Dulong people and the improvement of their status in society will

certainly affect the development of the Dulong people's economy, cultural heritage, and the application of science and technology.

In the economic aspect of the performance: first of all, the social group began to pay attention to this clothing culture is gradually dying out of the ethnic group; there is no lack of free designers or ethnic elements brand designers began to Dulong traditional clothing for a large number of innovative design, in addition to the design of clothing, Dulong Wenmian pattern, Dulong carpet production process, and color will be borrowed from the design of the use of other products, for example, canvas bags, canvas shoes, scarves, jewelry, household products and so on. Secondly, the Dulong will cause many ethnographers, photographers, designers and people to travel to the villages where the Dulong live to learn about the history and development of the ethnic group, to visit the only remaining Wenmian elders in the area to increase the income of the local Wenmian elders, and to buy Dulong blankets woven by the women in the area to increase the income of the local women and their families, and so on.

In terms of cultural inheritance, it is manifested in the re-emergence of Dulong traditional costumes in the society and the Dulong region, and the attention paid by the society, scholars, and designers to the traditional culture of the Dulong, while the Dulong people have also begun to be interested in their own traditional culture and costumes as well as greatly improved their sense of identification with their own culture. At this time, the inheritance power of Dulong traditional culture and costumes has greatly increased, not only through local Dulong people's publicity and protection but also through the development and promotion of many scholars, designers, and social figures.

In the application of science and technology, clothing virtual technology is the organic combination of clothing art and digital technology; it is like real people wearing real clothes, showing the effect of reality. The development of clothing digitalization will usher in the development trend of human-machine integration. The use of CLO3D software on the Dulong traditional clothing structure and wearing Table of the improved model human body virtual try-on function, greatly reducing the cost of fabric, labor costs of the development and utilization of the Dulong traditional clothing structure and expression of the innovative design provides a great convenience.

## **1.5 SCOPE OF THE STUDY**

### **1.5.1 GEOGRAPHIC SCOPE OF THE STUDY**

Gonshan Dulong Nu Autonomous County, Lisu Nu Autonomous County, northwestern Yunnan Province, Dulongjiang River, as a settlement of the Dulong ethnic group, is the most effective and feasible way to carry out research on traditional

ethnic cultures and cultural preservation in situ (Liu and Xiang, 2015), 80% of the Dulong ethnic group resides mainly in Dulongjiang River Basin to the west of Ganshan County. Others reside in Tsatsumi County in the Tibet Autonomous Region (TAR) and in Sister Lou in Vixi. The Dulong River has given birth to a unique Dulong culture, and as the only place in the country where the Dulong people live, the Dulong River creates a protective advantage for the culturally disadvantaged Dulong people; the Dulong River is also the only place where Dulong culture is passed on, and where the Dulong people have created a unique tangible and intangible culture. In a social environment where ideas and values are constantly changing, the traditional culture of the Dulong people has undoubtedly become weak, and the protection of culture in the Dulong River region has become particularly crucial.

### **1.5.2 TARGET POPULATION OF THE STUDY**

For the phenomenon that the traditional culture of the Dulong ethnic group is gradually dying out and being lost, the target group of this research and interviews is extremely critical and important. First of all, the traditional Dulong culture is lagging behind the current economic development mode of the society, which generates low economic benefits and decreases the attention of traditional ethnic culture. As a result of the diversification of society, multiculturalism has become an inevitable product of development, and the Dulong youth lack a correct understanding of traditional ethnic culture and begin to lack self-confidence and a sense of identity (He, 2020). Due to the lack of clear cognition and understanding of the traditional ethnic culture of the Dulong youth, failure to see through the phenomenon to the essence of the cultural essence, constantly pursuing the pace of high-speed development of the society, the urgent need to break the long-standing closed environment, and too quickly integrated into the external social environment, the self-confidence of the ethnic culture began to waver, and the original norms, religions, customs and other spiritual connotations continue to fade away. The ideological concepts of the Dulong youth and the elderly, who are influenced by multiculturalism, have deviations, resulting in the lack of cultural inheritance objects (He, 2020). The deviation of the new and old generations' conception of the traditional ethnic culture hinders the continuation of the Dulong-related ethnic culture, so the study's target population was chosen to be the young people of the new generation society.

Secondly, consider the role of women as the backbone of social development, contributing to social development and human progress. A study in Pakistan shows that women positively impact rural development (McAlister & Baskett, 2006). With the acceleration of urbanization and the transvaluation of social and economic structure, a large number of young and middle-aged men in poor areas have gone out to work, resulting in the phenomenon of male "absence", which has made women become the main force in rural construction, generating the obvious "super-half effect"

(Liao and Zhu, 2006). Village governance in the context of rural revitalization is not the business of a few cadres. Using household sanitation as an intermediary, we can build a bridge from household sanitation to village governance, thereby tapping into a group of women cadres, strengthening the degree of organization of rural farmers, and facilitating the provision of advice and suggestions for rural revitalization and the inheritance of traditional cultures in various aspects. Women are an important force in promoting the modernization of agriculture and rural areas, and they are the enjoyers and beneficiaries of rural revitalization, as well as the promoters and builders (Fu and Wu, 2020). For this reason, women are highly enthusiastic about devoting themselves to revitalizing traditional national culture. Women play a crucial role in the accumulation of rural capital, and women's education level is not only related to the realization of their own value but also to the physical and mental quality and capital accumulation of their offspring. At the same time, there is a significant correlation between women's educational status, their attitude towards education, and their offspring's acquired occupations (Moore, 2000).

Finally, considering that this research work aims to meet the aesthetic concepts of modern society and the development concepts of the modern society, the target group of this research also needs to be oriented to the social masses, in addition to the results of the interviews with the Dulong women, it is also necessary to set up a questionnaire survey of the purchasing preference of the 20-25-year-old girls who buy clothes in the society, and it is necessary to analyze and refer to the data of this questionnaire survey in designing the clothing structure, styles and colors. In designing the structure, style, and color of the clothes, it is necessary to analyze and refer to this questionnaire survey.

To summarize, this study's target population was women working at home in agriculture in the Dulong Nuer Autonomous County of Gongshan, Yunnan Province. Among the Dulong population aged 15 years and older, the proportion of married people was 70.99%, the proportion of first-time marriages was 58.96%, the number of people who remarried was 3.36%, the ratio of divorces was 0.65%, and the proportion of widowed people was 8.02%. The Dulong population was selected as married women aged 18-25. The social group was selected as women aged 20-25.

### **1.5.3 DISCIPLINES COVERED BY THE INSTITUTE**

This research needs to learn the theoretical knowledge related to another discipline, the theory of "ergonomics". In the early 1980s, ergonomics was introduced into China as an independent discipline, and the research started late. Clothing ergonomics is a branch of science that studies the interrelationship between human body characteristics, i.e., clothing and the human body. Its research object is "human - clothing - environment" to fit the human body as the starting point, the design, and production of clothing requirements so as to achieve the best state of beauty and

comfort. Based on the study of the theory of “ergonomics”, the author will propose the factors related to the body parts that affect the clothing and use them in the experiments designed for this research, and use them as the key factors to consider when evaluating the experimental styles using CLO3D.

#### **1.5.4 SCOPE OF RESEARCH ON DULONG TRADITIONAL COSTUMES**

The main subject of this research is the traditional costumes of the Dulong ethnic group. Firstly, the article will briefly sort out and summarize the origin, living environment, and traditional customs of the Dulong ethnic group; secondly, it will study the process of the Dulong blankets in terms of craftsmanship, color, structure and wearing Tables, etc. It will also analyze the materials and processes of the Dulong traditional costumes of the Dulong ethnic group in different periods of time, and then the structure and wearing Tables of the Dulong blankets. “After analyzing the structure and wearing Tables of Dulong carpets, and then summarizing and classifying the silhouettes of Dulong carpets in different wearing Tables, and obtaining the characteristics of the structure and wearing Tables of Dulong traditional costumes, we will discuss in depth the characteristics and cultural connotation of the Dulong traditional costumes, and explore the inspiration of the Dulong traditional costumes to the current clothing design, as well as learn from the structural design methods of the modern society. We will discuss the inspiration of Dulong traditional costumes to the current clothing design and draw on the structural design method of modern society, i.e., the “one-piece” structural design method, and the method of clothing expression, i.e., “unstructured clothing” expression method, to improve and innovate the Dulong traditional costumes, to win new thoughts and challenges for the innovative design of the Dulong traditional costumes. The researchers have been able to think and challenge the innovative design of the Dulong traditional costumes.



## 1.6 RESEARCH FRAMEWORK

Figure 1 Research Framework



Note. Figure by the author

## 1.7 RESEARCH METHODOLOGY

Through the study of the Dulong traditional culture, to organize and analyze the dilemmas faced by the Dulong traditional culture, it is necessary to conduct interviews and questionnaire surveys of the Dulong people in the Dulong Nu Autonomous County of Gonshan, the Lisu Autonomous County of northwestern Yunnan Province, which mainly focuses on the qualitative study of interviews of Dulong people wearing Dulong costumes and those who don't and the quantitative study of questionnaire surveys. The questionnaires were distributed to female Dulong people aged 20-25, and the quantitative research was supplemented by questionnaire surveys.

(1) Documentation method: According to the purpose of this dissertation, we collect information extensively through libraries, museums, networks, and other means, with the help of newspapers, magazines, books, and other Tables, and review relevant information and clues for the dissertation content in depth and in detail, so as to understand and grasp the history of the development of the Dulong costume, the cultural background, the practice of design and other related research problems. For the research object, a lot of information about the traditional costumes of the Dulong ethnic group and ergonomics theory is needed.

(2) Empirical research method: according to the textual information that has been consulted, with the relevant issues for fieldwork, during the observation, measurement, recording, and other related operations, for the exploration of the paper to provide factual support, and will be dedicated to the collection and first-hand information obtained from the fieldwork for the organization of the generalization and analysis of the comparisons.

(3) Exploratory malefactor method: mainly on the Dulong traditional clothing innovation design research malefactor carried out by the unknown results of the attempts and groping.

(4) Interview method: According to the content of the research involved in the Dulong group, clothing pattern makers, ethnographic experts, and clothing ergonomics experts conduct interviews, respectively, for each category of the interviewees to set up different interview questions and organize and analyze useful information related to the content of the study through dialogues with them.

(5) Questionnaire Survey: According to the research content, two questionnaires with different questions were distributed to young girls and Dulong women in the society to collect useful data and information related to the research and to provide data support for developing this research and innovation program.

## **1.8 ECONOMIC IMPACT ON THE COMMUNITY**

The modernization of Dulong traditional costumes is poised to have a significant economic impact on the community, affecting various aspects such as job creation, market expansion, and tourism. This section delves into a more detailed analysis, incorporating quantitative data and predictive models to forecast these economic changes.

### **1.8.1 JOB CREATION**

The introduction of modern techniques and materials into the production of Dulong costumes is expected to generate new employment opportunities. Based on our initial analysis, for every new production line established, approximately 15-20 jobs could be created, ranging from design and production roles to marketing and distribution positions. We project that within the first five years of modernization, the community could see an increase of up to 100 new jobs, based on the current population and the potential scale of production.

### **1.8.2 MARKET EXPANSION**

With the modernized Dulong costumes, there is an opportunity to expand into new markets, both domestically and internationally. Predictive models suggest that with effective marketing strategies and leveraging of digital platforms, the market

reach could increase by 50% in the first three years. This expansion is expected to result in a significant boost in economic turnover and contribute to the overall prosperity of the community.

### **1.8.3 TOURISM BOOST**

Revitalized cultural interest due to the modernization of traditional attire is anticipated to attract tourists, leading to a boost in local tourism. We predict a 30% increase in tourist visits within the first two years of the modernization initiative. This increase is expected to have a multiplier effect on the local economy, benefiting sectors such as hospitality, food services, and local artisans.

### **1.8.4 QUANTITATIVE DATA AND PREDICTIVE MODELS**

To support these forecasts, quantitative data from similar cases of cultural revitalization and market expansion have been analyzed. For instance, studies on the economic impact of cultural heritage preservation in other ethnic communities show a positive correlation between cultural revitalization and economic growth. Predictive models, taking into account the unique characteristics of the Dulong community and current market trends, have been developed to provide a robust projection of the potential economic benefits.

### **1.8.5 SUSTAINABLE ECONOMIC GROWTH**

A key aspect of this economic analysis is ensuring that the growth is sustainable and benefits the community equitably. Strategies such as capacity building, skill development, and support for small and medium enterprises (SMES) will be crucial in realizing the full economic potential of the modernization initiative.

## **1.9 KEYWORD**

Dulong dress structure; Dulong dress wearing Table; ergonomic theory; CLO3D evaluation

### **1. Dulong Clothing Structure**

Dulong clothing structure refers to the traditional clothing design and production techniques used by the Dulong ethnic minority in China. Their clothing structure often includes elements such as the use of specific fabrics, patterns, and production methods that are unique to their cultural heritage. This may involve:

**Fabrics:** Traditionally handmade, often using natural fibers found locally.

**Design:** Includes weaving techniques passed down from generation to generation.

Components: May consist of various parts, such as skirts, tops, and accessories, which together make up traditional clothing.

## 2. Dulong Clothing Wearing Chart

The Dulong Clothing Wearing Chart describes in detail how to wear traditional Dulong clothing. The chart may include:

Clothing Type: Lists various traditional clothing and accessories.

Occasion: Details when and where certain types of clothing are worn, such as festivals, daily life, or ceremonies.

Combination: Shows how to combine different clothing to create a complete outfit.

Instructions: Provides guidance on how to wear each item of clothing correctly. This paper focuses on studying and improving the wearing of Dulong traditional clothing.

## 3. Ergonomics Theory

Ergonomics theory refers to the study and application of equipment and systems designed to fit the human body and its cognitive abilities. In terms of clothing, ergonomic theory focuses on creating garments with the following characteristics:

Comfortable fit: Garments should conform to the body's natural shape and movement.

Improving performance: Well-designed clothing can improve physical performance by reducing stress and increasing ease of movement.

Preventing injuries: Well-fitting clothing can help prevent discomfort and injury, especially for people who engage in physical activities.

When applied to traditional clothing, such as that of the Dulong people, ergonomic theory can help modernize these garments to improve comfort and functionality while retaining cultural significance.

## 4. CLO3D Evaluation

CLO3D evaluation involves using 3D garment visualization software, CLO3D, to design, simulate, and evaluate garments. CLO3D allows designers to:

Visualize designs: Create realistic 3D models of garments to see how they will look and fit on different body types.

Simulate fabric behavior: Test how various fabrics drape and move on the body.

Optimize fit and function: Adjust designs in a virtual environment to ensure optimal fit and comfort before making physical prototypes.

Streamline development: Reduce the time and cost of producing physical samples by making design changes and evaluations digitally.

Using CLO3D to evaluate Dulong clothing designs helps innovate traditional clothing to be more ergonomic and suitable for modern use, ensuring that new designs meet both aesthetic and functional requirements.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 DULONG TRADITIONAL CULTURE

##### 2.1.1 DISTRIBUTION OF THE DULONG

Ancient documents once called the Dulong people pre, ornate people and ornate son, and Qing Dynasty Job Tribute Chart-Heqing and Other Prefectures of Ornate People describes that “ornate people are like people of ancient times, and ornate people, the ancestors of the present Dulong people, are the first people of the present Dulong people. The Qing Dynasty Official Tribute Map - Heqing and Other Prefectures Ornate People describes that “the ornate people are just like the people of ancient times. They call themselves Dulong“after the liberation of new China, in January 1952, Premier Zhou Enlai received from participating in the Central People's committee of the second member of the enlarged meeting of the representatives of the then governor of Gongshan Chan county KongZhiQing in which. Premier Zhou kindly asked Kong Zhiqing which nationality, Kong Zhiqing said: the old society, the reactionary rulers discriminated against us, insulted us, treating us as savages, calling us ornate son ornate yi. The Premier asked again, How do you call yourselves? Kong Zhiqing replied, Historically, we have called ourselves Dulong people, and the place where we gather is called Dulongjiang. Hearing this, Premier Zhou Enlai said in a firm tone, All acts of discrimination against ethnic minorities are not permitted, and all those insulting appellations of the past are abolished! You call yourselves Dulong people, which is a very loud ethnic name. In the future, the clan name of your people will be, as you wish, the Dulong!” Searching for Dulong people on the China Knowledge Network, according to the relevant literature data obtained from keyword searches, the earliest literature about the Dulong people to appear was the article “Dulong people on the Dulong River (Shi 1957), written by the Chinese scholar Shi Jian (1957). From the end of the 1970s to the present, the number of relevant research materials on the Dulong has been increasing without interruption over the years (Sun,2021). The culture of the Dulong people is nurtured by the winding Dulong River. In a closed environment, the Dulong people make a living by gathering, hunting and fishing, and mainly engage in primitive slash-and-burn agricultural production, thus Tableing a unique ethnic culture of one river, one culture. Gongshan is located at 98 “ 100 “ 30’ east longitude, 25 “ 36 “ 29’ north latitude. The average temperature is 14.8 “C. The hottest month is July, with a temperature as high as 35.7 “C. Gongshan shows the climate characteristics from south subtropical to cold-temperate zone, and there is no area with the same climate within a radius of about 20 kilometers. The variety of living creatures is so great that it reaches the level

of “all living creatures in one mountain”. The traditional cultural preservation and inheritance of the Dulong people is mainly reflected in the Dulong language, traditional ethnic customs, traditional handicrafts and traditional festivals. Since the Dulong people lack their own writing, the teaching of the national language and the inheritance of traditional folklore mainly originate from the teaching of their fathers; in the process of long-term historical evolution, the Dulong people have created a unique natural calendar, and the Dulong people have summarized the Dulong natural calendar, which is different from the Chinese lunar calendar, on the basis of the process of local production and labor, as well as the laws of the natural phenomena of the moon and the moon, the singing of the birds and the growing of the trees and the flowers; in the Dulong people’s traditional festivals, “Kachuowo” (New Year Festival) is the most important festival, in which the bull-plagiarizing ceremony is held to pray for favorable weather conditions in the year (Zhu,Liang,2016); the unique and mysterious way of life and ethnic connotation carry the traditional ethnic culture of the Dulong people that has been passed down from generation to generation.

### **2.1.2 RELIGIOUS BELIEFS OF THE DULONG PEOPLE**

The religious beliefs of the Dulong people are mainly based on primitive religions, and they worship mountains, rocks, rivers, the sun, the moon, the stars, and all kinds of plants and animals in the natural world. Gao Zhiying and other scholars have discussed the relationship between human beings, disasters and gods in Dulong society from a religious perspective. The Dulong people believe that plagues or calamities are punishments for human misbehavior. When human ability is beyond their reach, people will turn their attention to supernatural power, and the Dulong people hope that they can use this power to achieve the purpose of driving away disasters and praying for good fortune, reflecting the Dulong people’s wisdom of living in harmony with nature (Xue,2022).

In their own language, the Dulong people call ghosts “Brown”, there are many kinds of “Brown”, there is a difference in function and status between gods and ghosts, human beings also have souls, people will become ghosts after death, everything in the world also has ghosts, ghosts have their own special activity areas, and these areas are often treated as taboo places by the Dulong people. Ghosts have their own special activity areas, and these areas are often treated as taboo places by the Dulong. The primitive religion of the Dulong is characterized by the belief that both humans and animals have two souls, one of which is “Bra”, the living soul on which life depends; “The Dance Ecological Culture of the Dulong, a Less Populated Ethnic Group in Yunnan Province”. In “Survey and Analysis of the Dulong Dance Ecology and Culture of the Less Populated Ethnic Groups in Yunnan Province--Review of Dulong Culture”, it is mentioned that in the religious beliefs of the Dulong, it is believed that the second soul of a human being after death is called “Ahshi”, which is the second

soul of a human being after death. The second soul after a person's death is called "Ashi", and "Ashi" is the soul of the dead after a person's death. The living soul and the dead soul appear one after the other in the same living entity, always without contact with each other, but both will eventually perish. The Dulong people do not have the concepts of the immortality of the soul and reincarnation. If someone in the family dies, the Dulong people will bury the deceased in the vicinity of their own house, without building a grave, but only putting up a simple one-hatted frame on the land, hanging up some clothes used by the deceased during his or her lifetime, and offering several days of wine and rice (Pan,2021). As time passes, the grave site is no longer there, and the land can be opened for planting crops (Cai,2008). Usual deaths are usually buried in the earth, and various methods are used to appease the souls, and grass is swept and water is brought in for food offerings; for abnormal deaths, water burials and cremations are practiced to prevent the souls of the dead from haunting the area. When the dead are honored, "people gather to drink, sing and dance, and to share with the dead". On the face of it, this activity seems to be irrational and does not express the grief of the living. However, the underlying reason is that the Dulong believe that death is one's inevitable destiny and do not grieve too much for the dead (He,Li,1996.).

The area around Xiongdang in the upstream of Dulong River was deeply ruled by Tibetan Tusi and lamas in the old days. Therefore, the "Benjaminism" of Tibetan Buddhism has had some influence on the Dulong in this area, and the religious concepts of the Dulong shamans have drawn on the concepts of gods and ghosts of the "Benjaminism" (Wang,2001). The primitive religion of the Dulong believes that ghosts have a special area of activity, and the shamans say that where there are ghosts, crops cannot be grown. Before cutting down a large piece of volcanic land, sacrifices must be made to the ghosts or else the crops will not grow. The Dulong believe that any offense against ghosts and gods will bring misfortune to an individual or to the whole village, so in order to eliminate disasters and bring good fortune, they often offer sacrifices to the gods and send ghosts to the mysterious forces of nature; in the lower Dulong River, around the area of Maku and Babo, some of the Dulong believe in Christianity; in the 1930s, the American missionary Moles came to the Nujiang River area to preach, and he sent people to Dulong River many times to preach and to preach in Lahwajao, Maku, Mangdeng, Dimetam, Moporang, and Dime Dam, He also set up churches in Lavaje, Maku, Mengding, Dimetam, Mobolang and Duta. The pastor preached in Lisu and the Bible was transcribed in Lisu. Christianity prohibits the Dulong people from smoking, drinking and sacrificing to ghosts, which plays a positive role in increasing the knowledge of the people, reducing family disputes, and alleviating the economic burden of the Dulong people by prohibiting smoking and drinking. As can be seen from the foregoing, the Dulong people mainly believe in primitive religions, while some others have been influenced by the "Benjaminism" of

Tibetan Buddhism or by Christianity, thus creating a pluralistic character of religious beliefs.

#### (1) Nature worship

In the primitive society, the Dulong people believe that everything in heaven and earth has a soul, and they think that people's life, old age, sickness and death, and wealth and misfortune are all dominated by the "Spirit of Everything", thus they have all kinds of fear and worship to everything in the natural world. The souls of all things also have two sides of good and evil, and the evil souls will harass and violate people's safety, and when someone is sick or injured, or when something does not go well, or even when a child cries at night, they all think that it is caused by ghosts and spirits. An important part of the traditional culture of the Dulong people is divination. The Dulong people practiced divination and sorcery, and according to different things, they chose different ways of divination to foretell their fortune and fortune, and to find out their fortune and fortune. Out of their innate vigilance and self-protection against unpredictable ghosts, they will paint and embroider on their faces, leaving blue and black spots and stripes on their faces to look scary. One of the reasons is to scare away the ghosts that disturb them to keep them safe, and the second reason is to prevent their other souls from recognizing them until the time of their deaths, and in this way, they will preserve their lifespans. Those irresistible natural disasters in the ideology of the Dulong people, are considered to be ghosts, the Dulong people believe that the pain of suffering and not in line with the normal face of the face of the text can be exorcise the evil spirits, so as to achieve the spirit of avoiding disaster, tend to good luck and seek auspicious needs. To quote Marx, this is called "conquering the forces of nature by means of imagination and dominating them" (Yang,Zhang,1996).

#### (2) Ancestor worship

Ancestor worship is a Table of religion that took place during the matrilineal clan era, where the spirits of deceased matrilineal elders, and later the spirits of patrilineal heads, were worshipped. Only when a woman dies can she return to her ancestors and be recognized and protected by their spirits. Once the year is up, each "a-ha" will turn into a beautiful butterfly of various colors and fly to the earth. The beautiful flower butterflies are made by the women's asinine, while the red, blue and white butterflies are made by the men's asinine (Shen,,2005). From this idea, it can be thought that the pattern of Dulong people's face is the butterfly's unstable, which is the direct manifestation of the concept of the soul of religious belief. This primitive religious saying of soul reappearance is a reflection of the Dulong people's imagination and remembrance of the souls of their ancestors, reflecting the idea that they believe that their ancestors have some kind of connection with butterflies. The saying of recognizing the souls of their ancestors after death also indicates that members of the Dulong clan have to report to their ancestral souls after death, and are still a member of the family. If they do not have a written face and cannot recognize the second soul



after death, they will not be able to go back to their ancestors and will forever be lonely souls wandering around. Therefore, it can be seen that the Dulong people have a close relationship with ancestor worship. With the function of community symbols, the Dulong people follow the rules set down by their ancestors, according to the ancestral system will have a totem symbolic meaning of the symbols of the text piercing on the face, through the same body with the totem of the method, to seek the totem or ancestor's confirmation and protection, in order to achieve the ultimate goal of seeking good luck and avoiding disaster. This concept is deeply rooted in the minds of the Dulong people, as it has been passed down from their ancestors for generations.

### (3) Totem worship

The word totemism is derived from the North American Indian Ojibwano dialect "ototem-an", meaning "his kin" or "his totemic mark". Early primitive humans believed that clans came from a variety of specific species, mostly animals and, to a lesser extent, plants. For the clan's totem species, all love and care. The concept of totem is the budding Table of primitive religion (Xie, 1986). In the primitive religion, the totem worship as the core is a primitive religious Table combining nature worship, animal and plant worship, ghost worship and ancestor worship, which is the materialization of the belief that everything in the nation has a soul. Early primitive human beings regarded the totem as the patron saint of their tribe or clan, and as their own family standard and symbol. In the modern perspective, this kind of worship seems to be the direct worship of a certain natural object or animal or plant on the surface, but the essence of it is the worship, remembrance and following of one's own ancestors, and it is a kind of support and inheritance of the national spirit and emotion. As Marx pointed out in "Summary of Morgan's book Ancient Society": "Primitive people believe that their clans all originate from a certain animal, plant or natural object, and use it as a totem. The totem is the mythical ancestor, the protector of the clan", so "in the life of the clan, clothing and art Tables, have left a lot of totem remains". Totem worship arose in the early stage of clan society, and each clan had a totem that accompanied its own primitive religious beliefs (Shi,Duan,2004). The butterfly-shaped tattoo face of Dulong women is tattooed in imitation of the skin of their totem butterflies, and abstract butterfly ornaments are painted and embroidered on their faces to symbolize the shape of their totems, which are totem decorations and totem images illustrated by the materialization of deep-seated totem concepts. As the lowest religious, cultural phenomenon of human beings, the totem is closely related to other phenomena of primitive religions. It is blended with them, all of which come from human beings' pursuit of life. The primitive concept of totem comes from the primitive belief that "everything has a spirit", and in the period of "totem worship" of primitive religion, the concept of totem is combined with nature worship and ancestor worship, opening up a wide range of possibilities. Primitive religion has the reality of social life, and is an objective portrayal of the living environment and spiritual

support in human social life. The Dulong people take care of butterflies as if they were their relatives, and had banned the hunting and killing of butterflies. In their minds, although the appearance of butterflies is not like human beings, the process of their growth and reproduction, breaking out of the cocoon, lifting up their wings and flying, and the pursuit of freedom are similar to the state of mind of their own nation. The Dulong people aspire to live a carefree and free life like the butterflies, and the butterflies have become the goal of their hopes. Under such a specific environment, the Dulong people naturally take the butterfly, a totem symbol that combines their primitive consciousness and soul concepts, as the pattern of their literature. Butterfly totem worship is the main manifestation of the primitive religion of the Dulong people, and the butterfly pattern is a concrete manifestation, which can be clearly seen almost in the Dulong female pattern (Wang, 2011).

### 2.1.3 DULONG WENMIAN CUSTOMS

Tattooing on the face with writing samples, symbols and totems is called “whale face” and “embroidered face” in ancient literature (Li,1995). The Dulong people’s tattoos are only on the face, but not on other parts of the body except the face. Since there are only women in the written records of the Dulong people’s tattooing, and the visible tattooing objects of the Dulong people are only women, people often call the Dulong women “tattooing women”. Women’s tattooing is a traditional custom of the Dulong people. The Dulong tattooing in “Nu Bianxiang” at the end of the Qing Dynasty describes: “Women tattooed on their faces, noses and lips. (Figure 2) They apply plant extracts and soot to the tattoos, coloring them dacquoise blue. In contrast, Dulong women in the lower Dulong River have “women tattoo only one ring on the end of the nose and two to three rings on the lower lip.” Women generally enter adulthood at the age of twelve or thirteen, and are required to be tattooed by women who have some experience in tattooing. Wen face specific reasons for a variety of claims, there is no conclusive, after a long history, ancient and mysterious. Wenmian is a cultural symbol embroidered on the skin of the Dulong people, which used to be a custom of Dulong women, and is a unique expression of Dulong history, culture, religion and aesthetics, reflecting the needs of the Dulong people’s material and spiritual worlds, infiltrating their systems, behaviors and concepts, and being closely connected with their social life. From the 1950s, the custom of tattooing was thought to have disappeared. However, old tattooed women can still be found in the Dulong River, and the famous “tattooed women” are regarded as a living fossil of Dulong traditional culture. As a living Table of ethnic cultural symbols, it implies the ethnic code of the Dulong’s historical, social, religious and aesthetic concepts, and has multiple cultural meanings, representing the cultural significance of the Dulong ethnic group (Ba,2014).

**Figure 2** *Dulong Wenmian Women*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

The tattoos of Dulong women in different places of residence, upstream or downstream of the Dulong River, are also different. In the northern region of the upper and middle Dulong River, Dulong women popularly have large face tattoos, also known as Manchu tattoos, on their foreheads, cheeks, noses, and palates with diamond-shaped patterns and lines that Table a variety of motifs (Ba, 2014), and some older women not only have Manchu tattoos on their faces, but they also have shaved hair with only a small handful of it left in front of their foreheads. In the southern part of the lower Dulong River, only the circle under the lips or the chin part of the lower part of the lips, some only in the upper lip and jaw Wen a small piece, but also some Dulong women even under the nose of the middle part of the human body on the left and right, Wen strips into the upper and lower line, Wen road is less and thick, more clear, like a man's drooping beard, known as the small Wen face.

Vin-mien patterns also vary from family to family, and are an iconic feature that distinguishes clans or families. The Wenmian of the Dulong women is mysterious and abstract, similar in all places but generally resembling a butterfly or butterfly's wings. The pattern composition has certain rules and is composed using a combination of dots, lines, diamonds and wavy line elements (Ba, 2014). The bridge of the nose and the lower jaw are rhombic patterns like the body and tail of a butterfly, the dots and lines along the brow of the forehead are like the tentacles of a butterfly, the patterns on the cheeks are like the wings of a butterfly, and many Wenmian as a whole look like butterflies with spreading wings. Therefore, the pattern of the Dulong people is the butterfly unstable, which is the direct expression of the concept of religious belief in the soul. It is the main manifestation of the primitive religion of the Dulong people, and the butterfly pattern is the specific manifestation, which can be clearly seen in the Dulong female Wenmian pattern.

To this day, there is no convincing answer to the question of why the Dulong people wear the face. At present, there are several explanations for the Dulong's face

as follows: to survive, to prevent the Chawalong Tusi from capturing and looting the face; due to the nation's aesthetic sense; linked to the Dulong's concept of the soul, etc. Historically, the Tibetan Tusi sent people to the Dulong River Valley every year to collect all kinds of rents and taxes, and even snatched the Dulong women into slavery in the Tibetan area (Zhang, 2019). The Lisu slave owners in the Nujiang and Lancang River areas also often harassed the lower reaches of the Dulong River and took people into slavery. In order to avoid being taken away, women have their faces covered with tattoos to hide their appearance. During the survey, we learned that the older Dulong women were often dissatisfied with the old Tibetan Tusi. It can be seen that the Dulong women's facial tattoos have historical roots of exploitation and oppression. In the article "A survey and analysis of the dance ecology culture of the Dulong, a less populated ethnic group in Yunnan Province--A review of the Dulong Culture View", it is mentioned that in the religious beliefs of the Dulong, it is believed that the second soul of a person after death is called "Ah Tiny", and when the year is up, the second soul is called "Ah Tiny", and when the year is up, it is called "Ah Tiny". In the article "The Great View of Dulong Culture", it is mentioned that in the religious belief of the Dulong people, it is believed that the second soul of a person after death is called "Ahshi", and when the time comes, the "Ahshi" will turn into beautiful butterflies of various colors and fly to earth. The beautiful flower butterflies are transTableed by the women's "A-Xi", and the red, blue and white butterflies are transTableed by the men's "A-Xi". The Dulong people naturally symbolize butterflies with their totem, which integrates their primitive consciousness and concept of the soul (Shen, 2005).

Tattoo face is an extremely painful thing, the face is rich in blood vessels, nerves, the whole process of tattooing needs to be red, swollen, severe pain for 3-5 days, and the pattern of the text does not fade for life. The method of tattooing in the lower Dulong River and the upper reaches of the Dulong River has no obvious difference, only the pattern is different. Those who know the art of tattooing face use iron clips to clip out a few charcoals from the charcoal in a bowl, crush the charcoal, and then pour hot water, black ink well placed on one side. With a bamboo stick Cham good ink, first use the charcoal under the bottom of the pot or soot on the face to draw a pattern, one hand holding a bamboo needle on the face to draw a pattern, the other hand with an exceptionally sharp rattan thorns in accordance with the Wen type of needle by needle, continue to intensively beat until the face appeared in a row rows of needle eyes. After the needle is tied up, the face artist applies the blood that penetrates the girl's face, and then rubs her face repeatedly with pot soot and a dark-colored grass juice, or rubs her face repeatedly with a mixture of pot soot and dark-colored beads of oil mixed with powder, so that the color seeps into the skin, and it takes one day to finish the text. After a few days, the scars will fall off, and a permanent dark blue text road will appear on the face. A week later, when the scars have faded and the face has

recovered, the color of the tattoo is greenish-black. Thus, the most important stage in a girl's life is over.

## **2.2 UNIQUENESS OF DULONG TRADITIONAL COSTUMES**

### **2.2.1 OVERVIEW OF THE COSTUMES OF THE 25 ETHNIC MINORITIES IN YUNNAN**

There are a total of 55 ethnic minorities in China, of which the province of Yunnan contains 25 minorities and possesses a rich culture of ethnic minorities, all of which display their own unique styles and characteristics in their costumes, which are the crystallization of the wisdom and aesthetics of the local people.

In terms of materials, Yi clothing for both men and women is mostly made of natural materials such as cotton, linen and wool, and common production techniques include edging, pick embroidery and batik. The costumes of Yi women are mostly Wide-brimmed large sleeves They wear long pants or skirts, and the base color of their clothes is usually black, blue, or cyan (Xiao,Zhang,2023), and they embroider all kinds of floral patterns with red, gold, purple, and green silk threads on the bodice, back shoulder, cuffs, or the whole piece of clothing, with the most common patterns being those of animals, plants, geometrical patterns, characters, natural phenomena, and so on (Liu,Zhang,2023). There are common animal patterns, plant patterns, geometric patterns, text patterns, natural phenomenon patterns, etc. (Liu,Hou,2015); Yi clothing in Chuxiong is famous for its tasseled flower patterns (Guo,Zhao,2021); Hani traditional clothing is made of cotton, hemp, silk, and bird feathers. The production process of Hani clothing mainly includes hand weaving, dyeing, and embroidery. Black and cyan are the main colors of Hani costumes (Ma,Li,2014). Meanwhile, Hani costumes use a variety of colors to decorate their garments, and common colors include red, green, and blue. The common patterns on Hani costumes include patterns of flowers, birds, fish and insects, geometric shapes and so on (Li,2014). The structure of the Hani's clothing is varied in style, men wear lapel tops and pants with black or white cloth wrapped around their heads, women wear collarless right lapel tops and pants with colorful laces on the shoulder supports, lapels, cuffs, chests, and pants' legs, and in some areas they wear long Some regions wear long skirts or wrinkled long skirts. Some regions wear long tube skirts or wrinkled long skirts; the Bai people revere white, and in their costumes, white is the main tone of the dress is predominant. In Dali and other central areas, men generally wear white or blue head wraps, white lapel coats, black lab coats, and white and blue pants. The Bai men in the eastern part of the Erhai Sea wear suede or leather or satin collars, with embroidered bibs around their waists and blue or black pants. Dali around the Bai women's clothing with embroidered cloth or colorful towels wrapped around the head, wearing a white blouse, red shoulders, or light blue blouse, jacket black velvet lab coat, right lining of the knots hanging "three beard", "five beard"

silver ornaments, waist embroidered short waist, wearing blue pants under wide feet. The embroidered shoes. Patterns of birds, animals, nature, culture and life, and geometric patterns are dominant (Chen,2010), and there are also a variety of colorful cloud patterns; the structure of Dai men's clothing includes short shirts with collarless lapels or lapels with large lapels, and long pants with wide waists and no pockets, while the structure of women's clothing usually includes tightly fitted undergarments, and the jackets are either short shirts with no collars and thin sleeves, or narrow-sleeved shirts with large lapels and large lapels with narrow sleeves, and the lower part of the body often wears a tube skirt, which is long enough to reach the top of the foot (Chen,2010). The lower body often wears a tube skirt, which is long enough to reach the top of the foot (Jiang,2017), and the skirt is often woven with a variety of patterns or colorful decorations, mostly made of natural materials such as silk, cotton, and hemp, and the waist is often bound with a fine silver belt. The common colors of the Dai dress are white, scarlet, light green, sky blue, etc. The Dai dress production process includes textile, printing and dyeing, embroidery, brocade weaving, of which the brocade weaving process is very famous, of which common patterns include beasts and animals, trees and flowers, geometric shapes, etc., and common patterns include peacocks, elephants, etc.; the Zhuang people will be, linen, cotton, bananas, bamboo, wood, and other raw materials through a certain textile process, spinning yarn into threads and The main techniques are spinning, dyeing, printing, embroidery and so on. Zhuang men wear chest-breaking, laped Tang costumes made of local cloth, with short collars and lapels, wide pants, short and below the knee, some wrapped around the legs and tied with a head scarf. Zhuang women are wearing navy blue or dark blue short-collar right-over-right placket tops, some of which are embroidered with colorful lace at the neck, cuffs, and bottom of the placket, divided into two kinds of placket and placket, with collarless and collared differences, and wearing wide, fat, black pants with aprons at the waist and with blue, red, and green silk and cotton appliqués at the knees of the trouser legs. Women's clothing is mainly blue and black, with colorful lace, colorful silk embroidery and other decorations, common patterns are diamond, triangle, circle, trapezoid and other abstract shapes, and the rest of the plants and flowers and grass patterns. Animal Patterns (Frog Patterns, Fish Patterns, Snakes, Birds, Tigers) (Huang,2023); The Miao costumes are of various types, often made of hemp, cotton, fur, etc., and the crafts mainly include traditional handicrafts such as weaving, Miao embroidery, batik, etc., and the common patterns are divided into three main categories, namely, animal, geometric, and botanical patterns, including lions, tigers, elephants, deer, dragons, phoenixes, unicorns, plum blossoms, thin twig blossoms, and other decorations, and the rest are also plant flowers, grasses and plants, and the rest are also plant flowers, and the rest are , Plum blossoms, fine flowers, peonies, peonies, paeonies, pomegranates, peach blossoms, plum blossoms and so on (Liu,2017), which are often

found on the edges of the clothes, collars, cuffs and so on, and the Miao people like to use bright colors such as red, green, blue, etc., and the use of neutral tones, such as black, white and so on, are also common in the Miao costumes, which are used to balance the brightness and saturation of the overall colors. In addition, black, white and other neutral colors are also commonly used in Miao costumes to balance the brightness and saturation of the overall color. Men often wear a pair of lapel tops, but also left-over-overlooking tops and left-overlooking long shirts, etc., and the lower garment often wears loose-fitting pants with wide legs. Women often wear right-overlooking tops and round-necked chest-crossed tops, and common bottoms include various types of pleated pants and pants (Wang,2019); Yunnan Hui women's traditional clothing, the material is mainly cotton, silk, and brocade, and in the Zhaotong area of Yunnan, for example, the styles include a pink silk stand-up collar with right-over-overlooking long-sleeved bodice, a black, white, and blue, and three-color cloth collage with picketed bib and apron skirts, and black cloth with picketed pants. The clothes have black cloth lace on the collar, lapel, and cuffs, and flowers on the apron head and trouser legs, with geometric patterns, floral motifs, and Arabic symbols in praise of God (Bi, 2006); the costumes of the Lisu are mainly made of fireweed, flax, and sheep's wool, and are mainly based on the traditional crafts of hand weaving, embroidery, and cloth dyeing. Clothing is mainly in bright colors such as red, yellow, blue and green, and common patterns include geometric motifs such as diamonds, hearts, water patterns and crosses, animal motifs such as dragon totems and magpies and other auspicious animals, and botanical motifs such as flowers and leaves. Lisu men wear long or short linen shirts with knee-length pants, and some of them wrap their heads in green cloth. Women's dress styles are mainly of two kinds: one with a short shirt on top and a skirt underneath, with the skirt pieces reaching the ankles. The skirt has many pleats. There are two main styles of women's clothing: one with a short shirt and a skirt with ankle-length skirts and a lot of skirt folds, and the other with a short shirt and pants with a small apron tied around the outside of the pants (Wu,Liu,2022); Wa clothing is often made of cotton and hemp, and the handmade crafts include weaving, embroidery, and dyeing of cloth, with embroidery being one of the main crafts and is commonly seen on the neckline, cuffs, and waistbands. Most of the costumes are made of black and decorated with red, and Wa brocade is mainly made of black and red, embellished with white, yellow, blue, and green colors, with common patterns such as bull's head patterns, fire patterns, mountain patterns, botanical patterns, geometric patterns, and so on (Wang,2015). In Wa costumes, the tube skirt is one of the representative garments, and the females often wear lapel blouses, which are easy to put on and take off, and the waistbelt is often used to fix the waistband and to serve as a decoration, and the male top adopts a cross-front placket, Men's tops feature a cross front placket, making them easy to put on and take off. Men's tops feature a cross-over front design, making them easy to put

on and take off, in line with traditional style (Wang, 2015); Naxi costumes are mainly made of cotton, linen, silk, wool, leather, etc., and are made by traditional crafts, such as embroidery and weaving. In terms of color, Naxi dresses are mainly red, black and white, and some bright blue, green and yellow colors are also added, and there is a representative pattern on the sheepskin shawl called “Youchuo”. In addition to this, common patterns include animal patterns, plant patterns, abstract patterns (including back patterns, band patterns, zigzag patterns, and variations of wanzhi patterns, etc.) (Yin , Dai,Lin,2024). The dress style is mainly in Lijiang area, and the big lapel female jacket is mostly cloth robe. The basic structure is large sleeves, collarless, laminated, and short in the front and long in the back. The cuffs of the sleeves are rolled up to the elbows, with a shoulder and pleated waist, and the back is covered with a “sheep's poncho”, while the men wear linen and cotton clothes on the inside, and woolen felt on the outside. Woolen Felt Men wear linen and cotton garments underneath, wool felt or sheepskin kangshawls, black or blue pants, a belt around the waist, and cloth or leather shoes; Yao clothing fabrics are often made of hemp, and the Yao are known for their exquisite indigo printing and dyeing techniques, which end up in different colors such as indigo, greenish brown, and black (Liu,Lin,2016), and the rest of them are also embellished and embroidered, brocade and other crafts, the picking often has geometric patterns such as diamond pattern, tree pattern, fire pattern, cross pattern, frog pattern, octagonal pattern, etc. The women's dresses have a large-breasted blouse and a girdle with pants, and round collar short clothes with pleated skirts There are also those who wear long shirts with pants. The clothing of Yao men consists of short shirts or long shirts with lapels and left lapels; the clothing of Jingpo men is predominantly black and white, and they all wear black short shirts with lapels and black pants with wide tubes, and black head wraps, while men of some branches wear white shirts and white head wraps adorned with pom-pom tassels of various colors. Women wear black or assorted-colored button-down or right-breasted tight-fitting short garments and long cotton skirts in net colors or woven with characteristic Jingpo designs, with leg wrappings (Qu,Zhou,2015). The craft is mainly weaving, Jingpo brocade is made of twine, cotton thread and wool thread twisted by Jingpo women themselves who usually scramble for time, dyed and then woven with a waist machine line by line and picture by picture. The base color is mostly red and black, with red, green, yellow, blue, and purple wool or silk thread weaving a variety of fine floral patterns, some corner edges or special parts of the dark blue or black for the background, the pattern is mainly based on the natural world of birds and beasts, exotic flowers and plants, birds, insects, fish and crabs, and the natural phenomena that have been witnessed as a theme, for example: tiger footprints, crabs, frogs, and so on(Wu,Wang,Lin,2023); traditional Tibetan costumes are often made by the craft of hand weaving, using natural fiber materials such as wool and linen, etc. The colors of



Tibetan costumes are usually dominated by deep tones, such as navy blue, crimson, and coffee, etc., and in the costumes of some festivals or important occasions, gold and silver decorations often appear. The common patterns of Tibetan clothing include the Eight Treasures pattern, auspicious patterns, and also patterns of flowers, trees, and snow-capped mountains. Tibetan men: wear right-breasted cocoon silk shirts with high collars and hems and Tibetan satin robes, and crotch pants underneath. Women usually wear a short shirt with a right lapel of Tibetan silk with a brocade border, a large-breasted kangsha, a wide and long pleated skirt with a brightly colored silk belt, and a custom of wearing a cloak as a matter of personal property (Xu,Bai,2014); the clothing materials of the Browns mainly consist of cotton, ramie, and katsura, etc., and the Browns make their clothing by spinning, dyeing, and cloth making, especially the green brahman satin and the katsura. Green Brahmin Satin and Tong Hua Cloth are famous for their white and soft texture. The costumes of the Browns are mainly embroidered, mostly with various flowers, plants, birds and animals, and geometric shapes. Men wear clothes without collars and lapels, and wear wide pants in the lower half of their bodies; women wear undershirts with lace on the upper underwear, and the collars are embroidered with all kinds of floral patterns and designs, and they wear narrow-sleeved shirts; the gangster is usually made of solid color, with a slanting lapel, no collar, and set lace (Yang,2017), and the Browns are dressed up in bright colors and with lots of decorations when they encounter joyous occasions. In case of funerals, the clothing colors are mainly black, green and blue, and they do not wear ornaments (Dai,2014); the raw materials of Buyei costumes are plant fibers, while indigo, wax and maple incense are used for dyeing. The fabrics used are made from cotton processed into earthen cloth, plus indigo is used as a dye to make blue-dyed earthen cloth (Luo,2022). The Buyi prefer blue, green, black and white clothes. Men's clothes are basically the same in all regions, generally long shirts or short clothes with lapels, while women's clothes vary greatly. The local Buyi women's dresses are tops and skirts, and there are two kinds of fabrics, cotton and satin, and the choice of colors is also very rich, mainly consisting of four parts: tops, pleated skirts, waistbands, and headdresses (Yang,2023), and there are common botanical patterns, such as grain grain patterns, cinnamon patterns, plum blossom patterns, petal patterns, and animal patterns, such as herring-bone patterns, shrimp patterns, dragon patterns, and so on; the Achang people are mainly dressed in cotton, linen, and other materials. Achang clothing is mainly made of cotton, hemp and other materials, with brocade as the main craft. Achang girls often wear short shirts with right overlapping lapels, and married women wear short shirts with symmetrical lapels and vertical collars, the length of which is up to the hip line. Traditional women's pants are mainly made of black linen, with short length and fat cuffs. Men's tops are mostly short shirts, and the common points of Achang men's shirts are mainly embodied in the five aspects of colors, collar shapes, sleeve shapes, sleeve structures and outer outlines of the garments. The men's


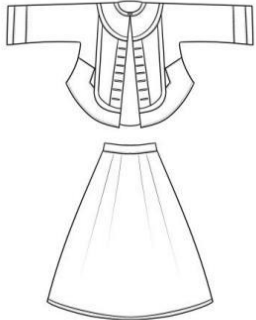
shirts are all made of black earth cloth or cotton as the main fabric (Qu,2015). Patterns are mainly geometric; Pumi clothing often uses yak tail, silk thread, wool, and leather as the main materials. Men's clothing, on the other hand, uses linen and leather as the main materials. The men's tops are short clothes with gold edges with lapels, and underneath they wear linen wide-gauge joggle pants without trouser belts, and underneath they add nine-foot-long and five-inch-wide linen cloth for the binding legs; the women's tops are short clothes with lapels, embroidered with lace, and underneath they wear white pleated joggle skirts, with a red line added to the edge of the foot of the skirt, and the skirt crotch added with a circle of thick white cloth with the skirt foot loosely sewn into the shape of a pleated fold (Yin,1992). Common motifs include stripes in red, yellow, green and orchid colors, and a red colored line is embroidered in the center of the skirt to symbolize the migration route of the ancestors. The colors of the Pumi costumes are mainly black, sky blue, red, white, yellow, green and other bright colors; Mongolian costumes are mostly made of fur, leather, tweed, felt, brocade, satin, and cotton, and most of them are reddish-purple, red, sky blue, blue, and so on, and the details of collars and belts are often in white, black, silver, gold, and so on (Liang,2024), often with exquisite embroidery, and with natural motifs such as flowers, birds, animals, and sometimes geometric patterns, which are often decorative and abstract. Some of the costumes may use knitting and felting techniques, such as the preparation of hats or scarves. The Mongolian robe is a representative of traditional Mongolian clothing, usually a wide robe, knee or ankle-length, and the collar and cuffs of the Mongolian robe are usually loose, making it easy to put on or take off and move around; Nu clothing is usually made of cotton, linen, woolen fabrics, etc. The production process of Nu clothing includes traditional crafts such as weaving, dyeing, and embroidery, and is often exquisitely embroidered on the edges of the clothes or on the collar and cuffs. Often the edges of the clothes or the neckline and cuffs are beautifully embroidered. The colors of Nu ethnic costumes are often bright, such as red, green and blue. The patterns of the costumes are diverse, including geometric patterns, animal and plant patterns, etc. The traditional costumes of the Jinuo men are generally basic, collarless and unbuttoned, with black and white as the main colors and cotton and hemp as the main materials. The lower body is mostly white or blue, more loose, or long or short pants. Women's clothing is mostly collarless, long-sleeved, open-breasted, short tops made of linen, with cloth instead of buttons, and the length of the top is only up to the navel (Jing,Chen,Xue,2019); the traditional clothing of the De'ang ethnic group is often made of cotton and ramie as the raw material, and after spinning, dyeing, and embroidery, the men mostly wear blue and black large-breasted tops and wide, short pants, wrapped in black and white, and the trousers are made of black, white, and black. Men mostly wear blue and black lapel tops and wide, short pants, wrapped in black and white turban, mostly white for young people and black for middle-aged and old people, and the ends of the turban

are decorated with colorful pom-poms. De'ang women mostly wear short tops and long skirts with lapels in navy blue or black, with two strips of red cloth along the lapels of the top (Wang,Liu,2009), and four or five pairs of large square silver medallions for buttons; long skirts generally cover the breasts and reach the ankles, and are woven with bright, colorful horizontal lines, and together with their distinctive waist bands they have Tableed a unique style of dress; aquatic clothing is often made from cotton, and traditional crafts are batik, which are made from cotton and cotton, with a traditional technique of batik. The fabrics of the ethnic costumes are often made of cotton, and the traditional techniques are batik and printing and dyeing (Guan and Qian, 2016); the embroidery part is often made of delicate lines outlining natural scenes, such as flowers, birds and beasts, or geometric patterns; hand-woven fabrics are often found on the edges of the costumes, decorations, or accessories; and the colors of the costumes are commonly found, including red, blue, and green, and so on. The common styles of ethnic costumes of the Water Tribe include cross-necked tops, long loose skirts, etc.; the Manchu robe or cheongsam is the traditional dress of the Manchu, Manchu women's costumes were originally loose, fat and large, the length of the service to cover the feet, and set with different patterns of large lace, Manchu dress patterns often have a group of lion patterns, phoenixes, the Eight Immortals, etc., in the choice of fabric color, the noble lady or the new woman is more often to use Zhu Hong, red, middle-aged women are more Lotus root color, the middle-aged girls like pink, green, moonlight, white and blue, and the middle-aged girls like pink, green, moonlight and white. Young girls like pink, green, moon white color, elders and elders with deep purple, elderly or women but orchid, gray color. Cheongsam fabrics are mostly satin, peasant women mostly use cotton and linen fabrics. Men's gowns with lace, with the status of the fabric used for satin. Early in the Qing Dynasty, mostly azure, and later popular rose purple, called the "lucky color". General men's blue, gray cotton and linen fabrics. Robe outside all sets of coats, commonly known as the waistcoat, more for the lapel, round neck, flat sleeves, slits on both sides, coats and umbilical cord only long. Men wear robes, robes tied outside the belt. Common patterns include cloud patterns, water patterns, etc. (Wang,2023); Lahu traditional costumes are often made of cotton, linen, silk, etc. In addition to textiles, Lahu costumes are made by weaving, embroidery, dyeing, weaving, etc. The colors of the costumes are usually bright, such as red, yellow, green, etc., and the patterns of the costumes are mainly based on nature, animals and plants, such as: the sun, stars, the moon, the moon, the moon, the moon, the moon, the sun, the stars, the sun, the moon, the moon, the moon, and so on. Lahu men wear robes with cross-collar and loose pants, with high slits on both sides of the robes, dark-colored cloth edging on the collar and lapel, and white, red and black cloth interwoven and wrapped around the head. Lahu women wear black cloth long shirts, long to below the knee, with slits on both sides and higher slits (Li,2020), standing collar and right lapel, decorated with

silver bubbles, and like to use red or white lace on the cuffs and lapels, which looks bright and beautiful. Wearing pants underneath; Dulong traditional dress often use rectangular blankets made of cotton and linen, Dulong clothing patterns are mainly reflected in the Dulong blanket, patterns in different colors with different areas of stripes, Dulong blanket is common colorful colors, they are accustomed to use a piece of linen from the armpit of the left shoulder diagonally to the chest to bare the left shoulder and right arm, the corner of the left shoulder with a straw rope or a bamboo needle tie knot waist, wear crossbow, arrow bag and machete. Women mostly wear dyed oil rattan rings around their waists for decoration, often draped with colorful beads, breast chains, earrings and even copper and silver coins.

## 2.2.2 ANALYSIS AND STATISTICS ON THE COSTUMES OF 25 ETHNIC MINORITIES IN YUNNAN PROVINCE

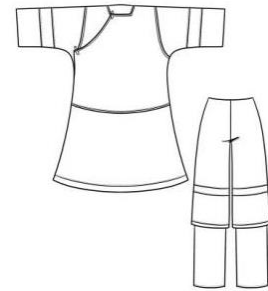
**Table 1** *Analytical Statistics on the Costumes of 25 Ethnic Minorities in Yunnan Province*

ethnic group	photograph	style chart
<p>Yi</p> <p>Material: cotton, linen, wool</p> <p>Crafts: paneling, floral embroidery, batik</p> <p>Color: black, cyan, blue as the main color, red, gold, purple, green as decoration</p> <p>Patterns: octagonal pattern, ram's horn pattern, triangular, diamond, fan, square, round, etc. Chuxiong Yi clothing is famous for tassel flower embroidery.</p>		

### Hani ethnic group

Material: flowers, hemp, silk, bird feathers  
 Craftsmanship: textile, dyeing, embroidery  
 Color: black, cyan, the main, red, green, blue as decoration

Patterns: flowers, birds, fish, insects, geometric patterns and other subjects



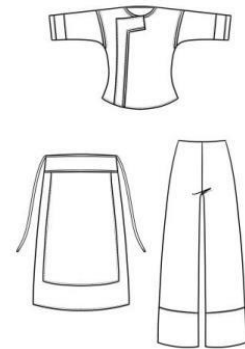
### Bai (ethnic group)

Material: suede, satin

Crafts: embroidery, tie-dye

Color: white as the main, red, black, blue as decoration

Patterns: flowers and fruits, animals, geometric patterns, cloud patterns



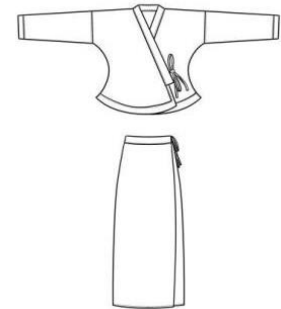
### Dai (ethnic group)

Material: silk, cotton, hemp

Crafts: textile, printing and dyeing, embroidery, brocade

Color: white, scarlet, light green, sky blue, etc.

Patterns: beasts and animals, trees and flowers, geometric shapes, common peacock, elephant patterns



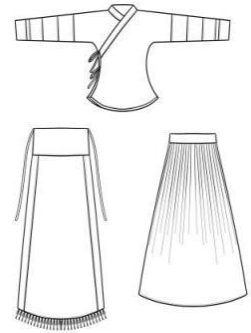
Zhuang: Bouxcuengh

Material: hemp, cotton, banana, bamboo, wood, etc.

Crafts: textile, printing and dyeing, embroidery

Color: black, black and blue as the main, red, blue, green, etc. as decoration

Patterns: diamond pattern, cloud pattern, Ruyi pattern, water wave pattern, sawtooth pattern, octagonal pattern, sun pattern, concentric circle pattern



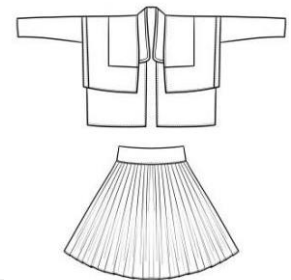
Hmong or Miao ethnic group of southwest China

Material: hemp, cotton, fur

Crafts: weaving, embroidery, batik

Colors: red, green, blue black, white

Patterns: dragons, phoenixes, plates, birds, flowers, grass, insects, fish, etc.



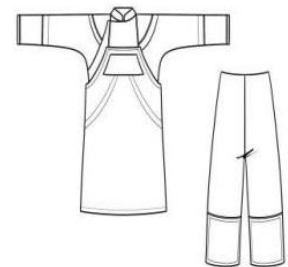
Hui Islamic ethnic group living across China

Material: cotton, satin, brocade

Crafts: weaving, embroidery, batik

Colors: black, blue, white, pink

Patterns: floral, geometric



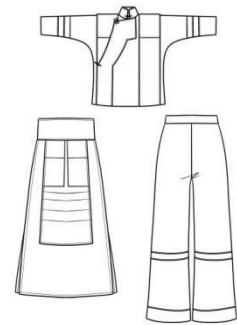
Lisu ethnic group of Yunnan

Materials: fireweed, flax, sheep's wool

Crafts: hand weaving, embroidery and cloth dyeing

Color: red, yellow, blue, green, black, etc.

Patterns: diamond, heart, water pattern, dragon totem, magpie, flowers, leaves and other patterns



Wa, Kawa or Va ethnic group of Myanmar, south China and southeast Asia

Material: cotton, hemp

Crafts: brocade, embroidery, dyed cloth Color: red, yellow, blue, green, etc.

Patterns: geometric patterns such as triangles, diamonds, crosses, etc.



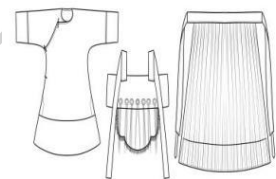
Nakhi ethnic group

Material: cotton, hemp, silk, wool, leather

Crafts: embroidery, textile

Colors: red, black, white as the main, blue, green, yellow and other color modification

Tattoo: "U-choke"



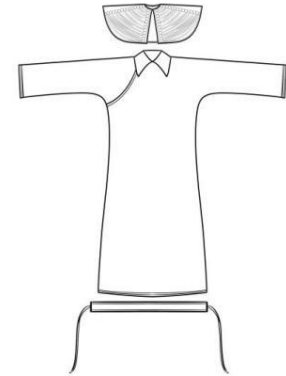
Yao ethnic group of southwest China and southeast Asia

Material: hemp, silk

Craftsmanship: indigo printing and dyeing, picking and embroidery, Brocade

Colors: blue, red, cyan and other colors are dominant, white trimmed

Patterns: Geometric patterns such as "dragon disk", "A" shape, "flying swallow" and so on.



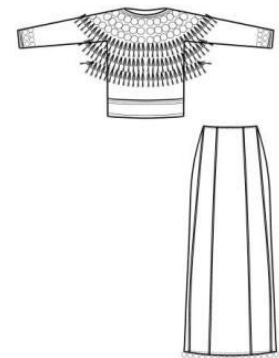
Jingpo ethnic group of Tibet and Yunnan

Material: hemp, cotton, wool

Crafts: Weaving, brocade weaving

Color: red, black as the main, red, green, yellow, blue, purple modification

Patterns: peacock pattern, crooked horn pattern, butterfly pattern, water clam step pattern



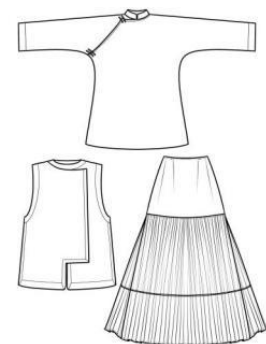
Tibetan

Material: wool, hemp

Craftsmanship: weaving, embroidery

Color: navy, crimson, coffee-based, gold, silver color for finishing touches

Patterns: eight treasures, auspicious patterns, also flowers, trees, snowy mountains, etc.





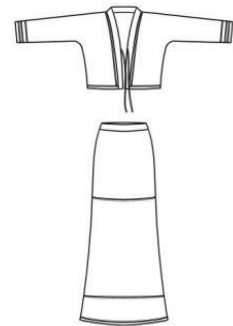
**Brown ethnic group**

Material: cotton, ramie, kudzu hemp

Process: Weaving, dyeing, kudzu

Color: black, light blue, white as the main, red, green for decoration

Patterns: flowers, plants, birds and animals, geometric shapes

**Buyei ethnic group**

Material: Cotton

Crafts: indigo dyeing, batik, picking clothes, embroidery

Colors: blue, cyan, black, white

Patterns: grain pattern, osmanthus pattern, plum blossom pattern, petal pattern and other plant patterns, fish bone pattern, shrimp pattern, dragon pattern and other animal patterns

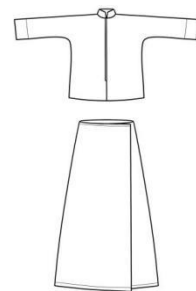
**Achang ethnic group of Qinghai province**

Material: cotton, mulberry silk

Craftsmanship: weaving, embroidery

Colors: blue, black, white

Pattern: Geometric

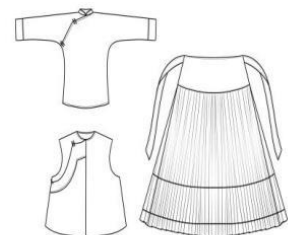
**Pumi ethnic group**

Material: yak tail, silk thread, wool, leather

Craftsmanship: weaving, embroidery

Color: sky blue, red, white, yellow, green, etc.

Pattern: Colorful horizontal lines



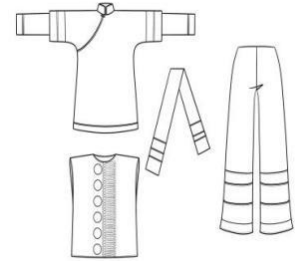
Mongol ethnic group of north  
China and Inner Mongolia

Material: fur, leather, tweed, felt,  
brocade, satin, cotton

Crafts: knitting, embroidery,  
felting

Color: red, blue, green, etc.

Patterns: flowers, birds, animals,  
geometric patterns



Nu ethnic group

Material: cotton, linen, woolen  
fabric, silk

Craftsmanship: weaving, dyeing,  
embroidery

Color: red, blue, green, etc.

Patterns: geometric, flora and  
fauna



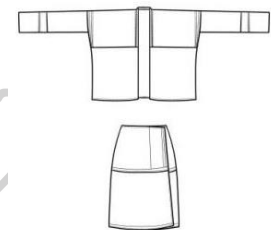
Jinuo ethnic group

Material: cotton, hemp

Craftsmanship: weaving, dyeing,  
embroidery

Colors: blue, red, black

Pattern: striped pattern



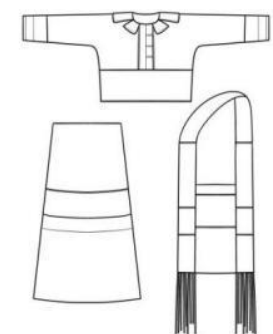
De'ang ethnic group

Material: cotton, hemp

Craftsmanship: weaving, dyeing,  
embroidery

Colors: white, black, blue, red

Pattern: Colorful horizontal lines



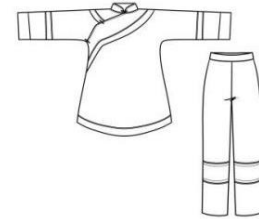
Shui ethnic group of Guangxi

Material: Cotton

Craftsmanship: hand-knitting,  
embroidery

Colors: red, blue, green, etc.

Patterns: flowers, birds, animals,  
etc., or geometric patterns



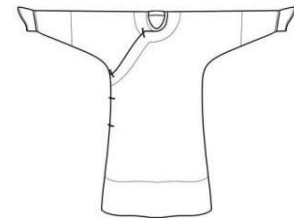
Manchu ethnic group of Liaoning  
province

Material: cotton, hemp, satin

Craftsmanship: hand-knitting,  
embroidery

Colors: Vermilion, Red, Lotus  
Root, Pink, Green, Lunar White,  
Deep Purple, Grey Plain,  
Celestial Blue,

Patterns: cloud pattern, water  
pattern



Lahu ethnic group of Yunnan

Material: cotton, hemp, silk,  
leather, wool

Crafts: weaving, embroidery,  
dyeing, knitting

Colors: red, yellow, green

Patterns: nature, animals, plants,  
etc. as the main theme of the  
pattern, such as: the sun, stars, the  
moon, etc.



Drung or Dulong ethnic group of northwest Yunnan

Material: cotton, hemp

Process: Spinning, Dyeing

Colors: red, yellow, blue, green, cyan, white, etc.

Pattern: colorful stripes



### 2.2.3 UNIQUENESS OF DULONG TRADITIONAL COSTUMES

Through the research on the costumes of 25 ethnic minorities in Yunnan Province, especially on the 25 ethnic minorities' costumes in terms of material craftsmanship, color, pattern, style, etc., the analysis found that the material craftsmanship of the Dulong ethnic group and the costumes of other ethnic minorities are mostly the same, with the materials being based on cotton and hemp plants and the craftsmanship based on handmade weaving; in terms of color, the study found that the majority of the ethnic groups use black, navy blue, red. In terms of color, research and analysis found that most ethnic groups use black, navy blue, red, white as the main color, which is used as the base color of the clothes, and a few colors with high brightness and purity are used as the modification, such as: red, blue, green, yellow, and the Dulong are very different from the other ethnic groups in terms of color, and the Dulong traditional clothes use the same piece of fabric color throughout the whole body, which is either a pure or colored color, and do not use a certain color as the main color as the base color. In terms of patterns, Dulong traditional costumes are different from other ethnic groups' traditional costumes, the patterns of most ethnic groups' traditional costumes only exist in the collar, cuffs, chest and other parts of the costumes, with embroidered botanical, animal and geometric patterns as the main ones, while Dulong's patterns in the costumes are shown as stripes, which are different widths of different colors of cotton threads and linen threads, and are applied all over the body; in terms of the structural styles, Dulong is even more different from other ethnic groups, and most of them have their own structural styles, and most of them have their own structural styles. The traditional costumes of most ethnic groups have their own development process of structure and style, and they have their own ethnic style costumes, such as the Miao pleated skirt, the Naxi big-breasted women's jacket, and so on, while the Dulong did not get a better development of their costume structure and style because of the geography, transportation, economy and other reasons, until after the founding of New China, the Dulong people opened their first photo to the world (Figure 3), and

the costumes they wore were only the Dulong blankets, which were in the Table of wrapping around the body and were used for the whole body, which were in the Table of wrapping around the body. The expression of the Dulong people is wrapped and draped around their bodies. Until today, most of the Dulong wear Han Chinese clothes, and the traditional costumes of the Dulong are gradually dying out. Almost no one wears the Dulong blanket any more, and only a few Dulong elders casually drape it around the outermost layer of their clothes (Figure 4)

**Figure 3** *Dulong traditional costume*

**Figure 4** *Dulong traditional costume*



*Note.* Figure from the Internet  
[新华网 让新闻离你更近 \(xinhuanet.com\)](http://www.xinhuanet.com)

#### 2.2.4 OVERVIEW OF DULONG TRADITIONAL COSTUMES

In the new China before the establishment of the Dulong people wear clothing clothing is relatively primitive, mainly leaves, animal skins, primary colors of hand-woven linen, mainly to cover the function of the cold as the main purpose of the Dulong people's clothing early records can be found in some of the local records of yunnan. Qing dao guang “yunnan tongzhi” volume 185 cited “clear duty tribute map” records: “ornithological people, living in lancang river outside the big snow mountain, the department of heqing, lijiang west outside the city wild barbarians. Its residence grass for hut, or to cover the bark. Men with hair, wearing hemp cloth short pants, barefoot. Women's ears decorated with copper rings, clothing also hemp cloth. .... There are even those who live in the rocky mountains, wearing wooden leaves, and drinking blood. They are just like the people of ancient times. Ornate people and the Nu people border, fear of which do not dare to cross the border.” In the early period of the founding of New China, the Dulong people made a direct transition from a primitive society to a socialist society. In the unique natural environment, inconvenient transportation and backward economic development, the traditional culture, customs and traditional costumes of the Dulong people could be better inherited and protected at that time.

The most obvious change in the traditional dress of the Dulong people is the introduction and application of textile technology as a demarcation, before textile technology was introduced to the Dulong people, the Dulong people's dress did not have any other major changes in shape or material, and they have been using primitive materials and maintaining a relatively primitive way of dressing. After the introduction of textile technology to the Dulong people, the Dulong people's dress changed, and the local people put on a piece of rectangular hemp cloth. After the introduction of textile technology to the Dulong people, the local people wore a rectangular piece of linen cloth, and the Dulong people also made dyes from wild or planted natural plants for coloring and making patterns. The Dulong men used to use one side of the blanket draped behind their backs, tucked in from the left to the right, and pulled it toward their chests to tie a knot, and wore shorts underneath, but covered the front and back of the buttocks and femurs. Women used two sides of long cloth, draped diagonally from the shoulder to the knee, around the front. Women mostly wear dyed oiled rattan rings around their waists for decoration, often draped in colorful, beaded, breast chains, earrings, most wear bamboo ear tubes and large copper rings, influenced by Tibetans, they also wear Tibetan-style silver inlaid with coral or turquoise large earrings, men and women like to dye rattan red as bangles and waist ring ornaments (Wang,2017). Men and women do not wear hats, and both sexes emit hair, with the front flush with the eyebrows and the back flush with the shoulders, the tips of the ears covered on both the left and the right, and bare feet. There is no widespread tattooing custom among Dulong men, but when some male children turn one year old, their parents tattoo the clan symbol on their wrists or arms to protect them from evil spirits and keep them safe.

The "one-piece" structural characteristics of the Dulong traditional costumes were gradually Tabled, and its simple costume structure led to the changeable Tables of wearing Dulong costumes, the same square long cloth Dulong people needed to wear different styles on different occasions, and the Tables of wearing Dulong traditional costumes were determined by different occasions and environments; after the establishment of New China, with the convenient transportation and economic development, the traditional culture of Dulong people was influenced by Han culture, which led to the gradual "Sinicization" of the traditional costumes. After the founding of New China, with the convenience of transportation and economic development, the traditional culture of the Dulong people has been influenced by "Han culture", which has led to the gradual "Hanization" of the Dulong traditional costumes, with the locals wearing Han skirts, vests and lab coats instead of bare bodies, which has led to the gradual "Hanization" of the Dulong traditional costumes, which has led to the gradual "Hanization" of the Dulong traditional costumes. As a result, the structure and Table of Dulong traditional costumes have gradually lagged behind, and the scene of wearing a Dulong blanket alone is rarely seen or even absent. Nonetheless, the old

Dulong people still wear a Dulong blanket as a matter of habit. In the New York Times, “China’s Dulong Face Modern “Metamorphosis” (2016), Anwei Huang reports that the modern Dulong have undergone dramatic changes in their lives, clothing, and transportation, stating, “If you had been here 10 years ago, you would have recognized the Dulong by their colorful clothing. Dulong people, about five or six years ago, the Dulong people all wore Han Chinese clothes.” This shows that the traditional culture of the Dulong is being lost and the traditional Dulong dress is dying.

## **2.3 DEVELOPMENT STATUS OF DULONG TRADITIONAL DRESS CULTURE**

### **2.3.1 THE RELATIONSHIP BETWEEN DULONG DRESS AND CULTURE**

N Jinfang N Phakdeephirot In. Internal Attributes of Cultural Resources Affecting the Capitalization of Costume Culture in Ethnic Tourism Villages: Using Market Operations as a Mediating Variable “ (2023), the relationship between costume culture and cultural heritage was verified in this study, which collected data from three Chinese tourism villages and categorized the internal attributes of costume cultural resources into three dimensions: value, revenue, and stock (Jinfang, N., Phakdeephirot,2023). The external conditions of market-oriented operation are divided into three mediating variables: property right relationship, market-oriented operation and quantitative evaluation of value, and cultural heritage as a moderating variable. The results of the study show that the internal attributes of clothing cultural resources have a positive effect on clothing culture capitalization; cultural heritage has a positive effect on the internal attributes of clothing cultural resources and clothing culture capitalization, and the relationship between them has a positive moderating effect. With the deepening of reform and opening up, a large number of new ideas and policies have been gradually integrated into the development of Dulong traditional culture, and the government's strong support has led to the rapid development of the Dulong economy and the significant improvement of people's living standards. However, the modernization concept and the temptation of the outside world make the traditional culture of the Dulong face the crisis of extinction. Zhu Qiong and Liang Zenghua in “Research on the Value and Inheritance of Dulong Traditional Culture” (2016) elaborated that even though Yunnan Province has promulgated a series of regulations on the protection of ethnic minorities in response to the crisis of the imminent disappearance of Dulong traditional culture, such as the Regulations on the Protection of Traditional Culture of Ethnic Minorities in Yunnan Province, they all treat the symptoms rather than the root cause, and have not

fundamentally solved the problem of the Dulong traditional culture being on the verge of loss, and Dulong traditional culture is still being lost at a rapid rate. culture continues to be fused at a rapid rate, and it has become an indisputable fact that the inheritance of Dulong traditional culture is in crisis (Zhu Qiong, Liang Zenghua. J. 2016). Wang Lijuan concluded in “The Dress Art of the Dulong” (2017) that the inheritance and protection of the traditional dress culture of the Dulong ethnic group, in addition to the function of the government, also need to enhance the Dulong ethnic group's own sense of cultural identity, familiarize themselves with the historical development of the history of their own ethnic dress and its characteristics, and understand the cultural connotation of their own ethnic group (Wang,2017). Improving the Dulong people's traditional aesthetic concepts of the Dulong people has a direct impact on the protection and inheritance consciousness of this ethnic culture. The most important point is that the traditional clothing culture of the Dulong people needs to consciously and proactively adapt to modern life and civilization. Only the innovation and evolution of the traditional culture itself can make the cultural subject solid and withstand the test. The baptism of the development of modern society. Yang Yan mentioned in the summary of the document “Contemporary experience of economic and social development of the Dulong ethnic group and the practice of poverty alleviation - based on the literature and field investigation of the ethnic help work in Dulongjiang Township” (2020) that the development of cultural products such as Dulong costumes, collection and organization of Dulong historical and cultural books, restoration of a number of “historical memory” and “red memory” are all important. “Red Memory” can promote the development of the Dulong ethnic culture industry (Yang,2020). He Shilun in “The Inheritance and Protection of Dulong Culture in the Process of Economic Development” (2020) made statistics on the current situation of traditional cultural inheritance of the Dulong ethnic group, most of the Dulong families of young and middle-aged people aged between 18-55 years old still retained the traditional national costumes such as Dulong blankets, gowns, and ga, but with a lower frequency of use, and they were worn almost exclusively on the occasions of important festivals, and 7.69% of Dulong families did not retain traditional national costumes; the Dulong families did not retain traditional national costumes; and 7.69% of them did not have traditional national costumes. The Dulong group has heard of or seen “Wenmian women”, and 88.46% of the Dulong group believe that Wenmian and clothing are one of the traditional cultural characteristics of the Dulong. The inheritance of dress culture needs to be carried out in an appropriate way with the development of the society, and a balance should be found between the aesthetic trend of the times and the process of protecting traditional culture (He,2020). Ma Guoxian in “Aesthetic Study of Dulong Consciousness” (2022) analyzed in depth the reasons affecting the aesthetics of the Dulong, among which are three important factors,



namely, the consciousness of reverence for life, the consciousness of spiritual witchcraft, and the consciousness of harmony, and secondly, the study refined the connotative characteristics of the aesthetic consciousness of the Dulong, summarizing them as pensive and still forceful, treacherous and mysterious, puerile and still truthful (Ma,2022).

### 2.3.2 DEVELOPMENT OF DULONG TRADITIONAL DRESS

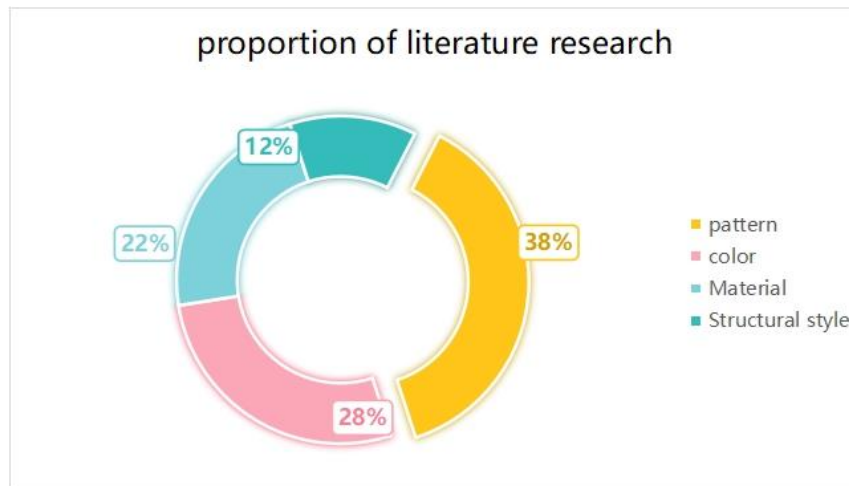
Kim, Young-Jae (Curator National Folk Museum of Korea) in “Study on Costumes of the Dulong People in Yunnan, China” (2004), conducted a literature review on the Dulong traditional costumes and briefly analyzed and categorized the men’s and women’s styles of Dulong traditional costumes. In the article, the author of the study briefly analyzed and classified the styles of the Dulong traditional costumes as belonging to the drapery style (Young-Jae, K,2004).

Liu Gang and Xiang Yiting in “Research on Dulong Clothing Culture” (2015) conducted an in-depth study on the production process of Dulong blankets, briefly elaborated on the characteristics of Dulong clothing, and summarized a very simple analysis of the characteristics of the Dulong traditional clothing in terms of the way males wear it and the way females wear it (Liu,Xiang,2015). Liu Gang and Li Zhi in “The Inspiration and Application of the Visual Elements of Dulong Culture in Modern Design” (2016) made a brief analysis of the Dulong traditional cultural elements patterns, which are tattooed butterfly pattern, stripes, back pattern, cow horn pattern, and round bead pattern, and finally the study also analyzed and elaborated on the application fields of the above several kinds of pattern patterns (Liu, Li,2016). Zhang Lei, in “A preliminary exploration of the aesthetic value of stripe decoration on Dulong blankets” (2020), briefly analyzes the colorful stripe matching of Dulong blankets and divides them into three kinds of color matching, and briefly explains the production process of Dulong blankets as well as the Tables of wearing them, but does not analyze in depth the structure of the Dulong blankets and the characteristics of the different Tables of wearing them (Zhang,2020). Wang Ruifang in “Research on the Application of Dulong Traditional Culture in Display Space Design” (2021) briefly analyzes and refines the traditional cultural elements of the Dulong ethnic group, which are the craftsmanship of the Dulong blankets and ornaments, the shape and color of the Dulong blankets, and the patterns of the Wenmian customs, and proposes the methods for the application of the Dulong traditional culture in the design of the display space, which are as follows: fusion of the design concepts, direct reference method, metaphor method, reconstruction method, material replacement method, and the integration of new technology (Wang,2021). He Yve and Li Yiqian in “The Development and Utilization of Dulong Blanket Handicrafts” give a brief overview of the pattern characteristics of Dulong blankets, that is, analyzing and refining the Dulong blanket’s “stripe” pattern, and then explaining the different application fields

and products of the “stripe” pattern (He,2021). It then explains the different application areas and products of the “stripe” pattern (He,Li,2013).

In the past 10 years, there is no lack of scholars on the Dulong traditional culture and traditional dress and other related issues for research, through the Tabler research and organization found that the Dulong traditional dress and culture on the verge of extinction has become an indisputable fact, through the dress culture of this aspect of the in-depth study and combined with the innovation of the development of modern society to awaken and enhance the Dulong people's sense of cultural identity is an effective and rapid method and way. It is an effective and fast way to enhance the cultural identity of the Dulong people through in-depth study of the dress culture and innovation in combination with modern social development. Because of the historical reasons for the development of the Dulong ethnic group, there are too few documents and photo records related to the study of the traditional costumes of the Dulong ethnic group. Through the literature collation in the past 10 years, we found that (Figure 5), the Tabler pays more attention to the traditional costumes of the Dulong ethnic group by analyzing and applying the Dulong cultural patterns, the study and analysis on the colors and unique striped patterns of the Dulong carpet, and the innovative application in combination with various fields, as well as the study and analysis on the traditional costumes of the Dulong ethnic group by combining with modern social development. By summarizing the above contents, the author found that the research on the systematic study and analysis of the Dulong traditional costumes is relatively small and incomplete, and the research on the structure and style development of the Dulong traditional costumes is relatively small, and it is noticed that the Dulong traditional costumes are mainly made of “one-piece” structure of “Dulong carpet”. Fewer scholars are concerned with the “Dulong carpet”, and almost no scholars are concerned with the characteristics of the structure and expression of the Dulong traditional costumes, and there is a lack of systematic collation and analysis of the “one-piece” structure and expression of the Dulong. Therefore, in this research, the author will systematically organize and analyze and summarize the material technology, color classification, structure, expression and silhouette of Dulong traditional costumes, and then carry out innovative design and improvement of the structure and expression of Dulong traditional costumes through the results of the organization and analysis.

**Figure 5** Graphical representation of the proportion of Dulong literature study



*Note.* Figure by the author

The author of the Dulong traditional clothing structure and style research and innovative design, the new era of clothing structure and style research and clothing design requires the author to pay attention to the ergonomics of this new discipline, through the study of the theoretical knowledge of ergonomics, research and analysis of the human body structure and the relationship between the structural factors of the garment, in order to analyze the clothing structure of the style of the fit, comfort and do the theoretical knowledge to support.

## 2.4 ERGONOMICS

### 2.4.1 ERGONOMIC CONCEPTS

The concept of ergonomics was first developed in Europe and later in the United States. The term “ergonomics” was first used by the Polish natural scientist Wojciech Jastrzejniewski, who proposed a theoretical study of human labor modeling based on biology, arguing that “the human being is an integral part of the work system”. In the early 20th century, the American scientist Tyrol devised a method of manual labor, looking for a time-saving, yet efficient method. Later in the Second World War, countries began to use ergonomics in the tanks, aircraft cabin design, the use of man-machine-environmental laws, to achieve the people in the cabin for effective operation and combat, as much as possible so that people in a long time, small space to reduce fatigue, and to achieve a higher state of war individual. After the war, the International Ergonomics Association was established in 1960, and many countries have rapidly and effectively applied ergonomics to space technology, industrial production and other technologies.

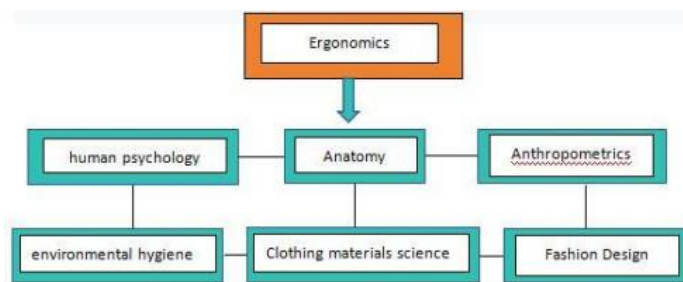
Ergonomics is a science developed from the basic theory of human physiology, and was first developed to study the coordination between humans and machines in industrial society. Simply summarized as “man-machine-environment”. It is a discipline that explores the regularity of people's labor, work efficiency, and efficiency, and consists of six disciplines: anthropometry, biomechanics, labor physiology, environmental physiology, engineering psychology, and practical engineering research. Ergonomics is composed of human body dimensions and constructional dimensions. For human body dimensions, the structure of the human body is very complex, and a variety of factors have to be considered when designing the space, such as, for example, the appearance of the human Table and the characteristics of the movement. Regarding any of these designs, it is important to fit the two foundations of ergonomics.

#### 2.4.2 ERGONOMICS AND FASHION DESIGN

Apply ergonomics to clothing design and propose a system that is human-centered, clothing is the medium, and the environment is the condition. the “human-machine-environment” converted to “human It is to convert “human-machine-environment” into “human-apparel-environment”. Starting from the various requirements suitable for the human body, the design of clothing structure puts forward theoretical and practical basis, and puts forward requirements for clothing design and production, so that the design can adapt to the needs of the human body as much as possible, and achieve the state of clothing fit and comfort on the body. Learning ergonomics theory can help fashion designers better understand methods that conform to human body characteristics at the beginning of clothing structural design, so as to grasp structural design more intuitively and accurately. so that the clothing will eventually achieve the “clothing-human-environmental” relationship of unity. Unification of “clothing-human-environment” relationship.

The combination of ergonomics and apparel design has resulted in a system that involves a number of aspects (Figure 6), summarized as follows: human psychology, human anatomy, anthropometrics, environmental hygiene, apparel materials, and apparel styling and design

Figure 6 Connection between ergonomics and clothing design



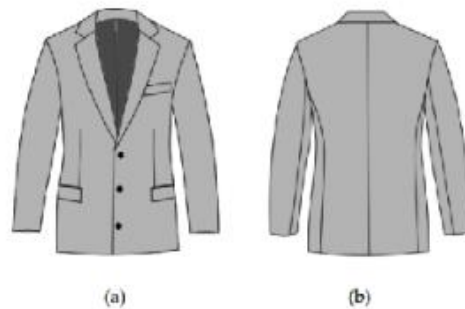
### 2.4.3 CURRENT STATUS OF RESEARCH ON CLOTHING ERGONOMICS

Wafaa A.ELsayed Maha M.T.Eladwi Nagah S.Ashour Rania N. Shaker Eman M.S.Shaheen in “Ergonomics Approach For Fashionable Apparel Design” (2018) used cotton fabric as the main material, set up a number of different fabric treatment processes such as: tie-dye, printing, etc., to produce several sets of garments with different styles, using the theoretical knowledge of ergonomics, Evaluate the overall five aspects of a garment from multiple perspectives: comfort, aesthetics, safety, ease of use and durability. The article mainly reflects the relationship between garment materials, garment style and shape, and the human body (ELsayed, W. A., Eladwi, M. M., Ashour, N. S., Shaker, R. N., & Shaheen, E, 2018). Zhao Yan in the “Study on Functional Garment Design of Elderly People Based on Ergonomics” (2018), he did research and analysis on the physical and psychological characteristics of the elderly people by using garment ergonomics as a basis (Yan, 2021). At the same time, the design elements were analyzed in terms of the shape, fabric, color, pattern, and structural details of the clothing, and the analysis summarized the main constituent elements of functional clothing design for the elderly. This research mainly reflects the important relationship between human psychology, human anatomy and clothing modeling style design. Zhao Meimei, Shi Jingjing, and Zhu Zihui in “A preliminary study of the application of ergonomics in the design of cheongsam” (2018) Mainly based on ergonomic theory, it explores the most comfortable temperature for the human body after wearing clothing., and analyzed the moisture absorption, moisture permeability, and air permeability of different clothing materials, and at the same time briefly analyzed the relationship between the human body and the structure of the clothing, and finally concluded that the cheongsam should be combined with human engineering in the process of innovation, and analyzed and summarized the main components of functional clothing design for the elderly. It is necessary to combine the theory of ergonomics in the process of innovation (Zhao, Shi, Zhu, 2018). This research and design reflects the important relationship between anthropometrics and clothing material science and clothing style and styling design. In “Ergonomic design of overalls for agricultural workers of Uzbekistan” (2020), Sabokhat Pulatova and Nargiza Bebutova extracted the four most common postures among agricultural workers' frequent activities and analyzed the interaction between the human body and clothing components in the four postures. Contact, and through algorithms, the dimensional characteristics of “back width”, “chest width”, “waist and hip line”, etc. in clothing under different postures are obtained. The results of this research solve the comfort problem of wearing work clothes for agricultural workers and provide agriculture The design of work clothes proposes constructive solutions (Pulatova, Bebutova, 2020). This article reflects the relationship between body measurements and

clothing styles. According to Badar Ethiopia (2021), it was reviewed and outlined of the contemporary methods and approaches to ergonomically based clothing comfort measurement, where four main techniques are used to measure wearing comfort: objective measurement, subjective evaluation, combination of objective and subjective techniques, and computer modeling of human-fabric interactions. Subsequently, a new biomechanical approach to skin modeling is introduced, and it is proposed that the thermal properties of textiles have an impact on the ergonomic theory of clothing comfort; the compression properties of clothing fabrics and the ductility of clothing fabrics are also a major factor influencing the comfort of the human body in wearing garments, and finally it is concluded that for different methods of modeling measured comfort, the combination of objective and subjective measurement techniques will yield the best validity ( Teyeme, Malengier Tesfaye, Ciesielska, Haji, Van Langenhove, 2021). The article focuses on the effects produced by clothing materials on the human body. Wang Yang, Zhang Zhenlin, Wei Yuhui, Wang Shaofei, and Su Zhaowei analyzed the morphological changes of the human body during basketball in “Optimization of Basketball Clothing Structures Based on Ergonomics” (2022), and studied the changes of the frontside, backside, and side of the human body, and then optimized the structure of the basketball clothing, and then evaluated the optimization effect with the help of the wearing experiment. Finally, the optimization effect of the garment was evaluated by wearing experiment. The results of this study show that the knee joint, hip, buttock, shoulder joint and armpit change the most obviously in the process of basketball, and the degree of change significantly affects the size, shape and fabric of the corresponding parts of the garment. This research mainly reflects the important relationship between anthropometrics and clothing style design, especially for sports with large movements that are different from daily life activities, the rationality and functionality of clothing structure and shape are extremely important (Wang, Zhang, Wei, 2022). Eva Lapkovska in the “IMPROVEMENT OF METHODS FOR EVALUATION OF ANTHROPOMETRIC FIT AND ERGONOMICS OF CLOTHING” (2022), a doctoral dissertation, Eva Lapkovska researches and develops an algorithm for evaluating anthropometric adaptations and ergonomics of garments, and describes the implementation and operation of the algorithm. The initial algorithm of the algorithm in the article was developed within the EU European Regional Development Fund, Interreg BSR program project “Smart Safe Workwear”, and the proposed improvements to the algorithm in this case will help users and supply services to understand the issues between anthropometric fit and ergonomics of garments, and will help to improve the efficiency of future procurement, tender evaluation and decision-making (Lapkovska, E, 2022). This article focuses on the relationship between anthropometrics and clothing comfort. Manuela Lacramioara Avadanei, Sabina Olaru, Ionut Dulgheriu, Savin Dorin Ionesi, Emil Constantin Loghin and Irina Ionescu in the study “A New

Approach to Dynamic Anthropometry for the Ergonomic Design of a Fashionable Personalized Garment” (2022), the authors integrated data from 50 customers and model data were integrated into the the garment pattern graphic layer (Figure 7) of a CAD system (a common software used to draw garment patterns).

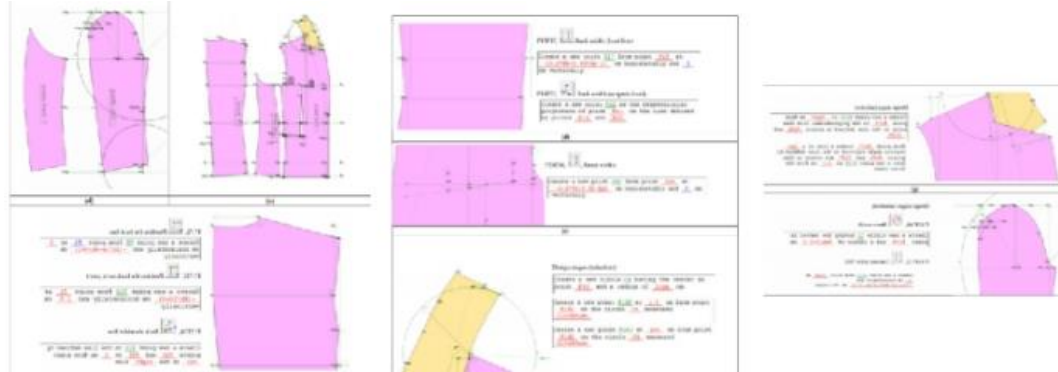
**Figure 7** Clothing style diagram of the case study in the literature



*Note.* Figure from (Lapkovska, E,2022)

By using mathematical relationships to determine the location of important points on the pattern contour of a garment pattern, these points are then connected and modeled with straight or curved lines according to the product requirements. If the initial data values and the structure of the mathematical relationships used in the design scheme are changed, a new pattern is automatically generated accordingly (Avadanei, M. L., Olaru, S., Dulgheriu, I., Ionesi, S. D., Loghin, E. C., & Ionescu, I,2022). The mathematical algorithm enables designers to quickly design new styles according to customer requirements, (Figure 8) to diversify/personalize the products placed on the market, to reduce the validation time of new prototypes and to try out the most complex design solutions

**Figure 8** Literature study using mathematical algorithms for design sequence on 2D layout graphics



*Note.* Figure from (Avadanei, M. L., Olaru, S., Dulgheriu, I., Ionesi, S. D., Loghin, E. C., & Ionescu, I,2022)

The study also used static and dynamic positional testing and evaluation of models in a 3D virtual environment, (Figure 9) so that the evaluation of the virtual environment could verify the design wearing effect of the new model and significantly reduce the number of physical prototypes, which also means a significant reduction in the amount of raw materials, energy and chemicals required. The study used the virtual fitting function of the CLO3D software to test and evaluate the functionality and comfort of clothing styles based on ergonomic theories to determine the factors that influence the interaction between the human body and clothing.

**Figure 9** Literature Study CLO3D Garment Measurement



Note. Figure from (Avadanei, M. L., Olaru, S., Dulgheriu, I., Ionesi, S. D., Loghin, E. C., & Ionescu, I,2022)

Yan Zhang, and Miao Yu in “Ergonomics-based Structural Design of Labor Protective Clothing” (2024), briefly analyzed the working environment and physical activity needs of the wearer of labor protective clothing, and innovatively designed the structural styles of the previous labor protective clothing, adding organ pleat design in the back, armpits and other parts of the larger activities, increasing the fit of the garment; adding three-dimensional tailoring in the knee area as well as the Protective materials are added to increase the protective function of the suit; reflective strips are added to the outside of the suit to increase the safety of night workers and other issues. The research design of this article mainly reflects the important relationship between anthropometry, environmental hygiene and clothing material science, clothing style and modeling design (Zhang,Yu,2024). Zhuang and Shuang in the “ergonomics-based “one-piece” clothing structure research”, through the questionnaire survey on women’s preference for the appearance of fitted clothing and statistical analysis of the data, found that the main reason for people to choose the layout is comfortable, in the process of designing one-piece clothing, taking ergonomics as the starting point, with the help of different Tables of the province and the special sewing way to create a space between the clothing and the human body. In the process of designing one-piece garments, ergonomics is taken as the starting point, and the space between the garment and the human body is created with the help of



different Tables of provinces and special sewing methods, (Figure 10) to produce ready-made garments (Zhuang,2023).

**Figure 10** Literature research CLO3D virtual wearing effect demonstration and evaluation



(a) 修正版 (b) 正面压力图 (c) 背面压力图 (d) 正面应力图 (e) 背面应力图 (f) 透视图

Note. Figure from (Zhang,Yu,2024)

Through a large number of literature searches, the author has organized some of the relevant studies on the application of ergonomics and clothing, and I found that more and more designers pay more attention to the comfort of the human body when designing garments, whether in the development of materials or structural style improvement, so it is necessary and crucial to research and develop new structural style garments with the theory of “ergonomic” as the basis of innovative design support. Therefore, it is necessary and crucial to research and develop new structural styles of garments with “ergonomics” theory as the basic support of innovative design.

## 2.5 CLOTHING MODELING SOFTWARE

Apparel modeling software is a class of computer software tools designed specifically for designing, simulating, and manufacturing garments. These software help designers and apparel manufacturers create and adjust apparel designs in a virtual environment, thereby reducing the number of actual samples produced, saving time and costs. Apparel modeling software typically has the following functions and features:

(1) Design and simulation: Real-time 3D preview, designers can see the effect of clothing on the virtual human model in real time, including the drape and dynamic performance of the fabric.

(2) Fabric Physical Properties: Simulate the physical properties of different fabrics, such as thickness, elasticity, friction, etc., to make the design more realistic.

(3) 2D Drawing and Platemarking: 2D drawing design, support the design from the plane drawing, provide a variety of drawing tools for creating and modifying drawings.

(4) Patternmaking and code release: automatically generate paper samples and code release to improve design efficiency and accuracy.

(5) Virtual fitting: simulation of fitting, through the virtual mannequin to try on the designed clothing, to check the fit and comfort.

(6) Dynamic simulation: simulate various movements of the wearer to view the performance of clothing under different sports conditions.

(7) Automation: automatic layout and cutting, according to the design automatically generate the optimal fabric cutting program to reduce waste.

(8) Optimize the production process: provide an integrated solution from design to production to improve production efficiency.

(9) Compatibility and integration: Multi-platform compatible, supporting seamless integration with other design software and production systems.

(10) Data sharing and collaboration: support real-time collaboration and data sharing between teams to facilitate remote work and project management.

### **2.5.1 CLO3D**

CLO 3D is an advanced 3D apparel design and virtual fitting software, the development and application of which has greatly contributed to the digitization of the fashion and apparel manufacturing industries. CLO 3D was developed by CLO Virtual Fashion, a Korean company founded in 2009 that specializes in developing apparel design and virtual fitting software. CLO 3D Virtual Fashion's The founding team includes fashion designers, engineers and computer scientists whose goal is to streamline the apparel design and production process with digital tools that reduce the time and cost of actual sample making.

CLO 3D has brought significant efficiency gains and cost savings to the apparel industry through its powerful 3D design and simulation capabilities. Through continuous technological innovation and functionality expansion, CLO 3D will continue to lead the digitalization trend of apparel design and production in the future.

### **2.5.2 THE DEVELOPMENT OF CLO3D IN APPAREL DESIGN APPLICATION**

Xie Liping in “Exploring the application of CLO3D software in the teaching of three-dimensional tailoring” concludes that realizing the organic integration of three-dimensional tailoring and plane structure, CLO3D software can meet the three-dimensional modeling design needs of creative clothing styles, shorten the correction time of three-dimensional modeling, and save the cost of materials and time in the process of paper pattern modification (Xie,2023). In “Feasibility Assessment of Clothing Private Customization Based on CLO3D”, Ding Liang used CLO3D virtual fitting software according to customer needs, and finally realized the

design of clothing styles to satisfy customer needs through the steps of adjusting parameters, sewing thread editing, fabric selection, pressure testing, and rendering simulation, etc. The results showed that the CLO3D fitting software also takes into account the wearing effect of the clothing under the satisfaction of the customer's needs. The results show that the CLO3D fitting software can satisfy the customers' needs and also take into account the wearing effect and comfort of the clothes, Verified the scientificity and accuracy of CLO3D fitting software (Ding,2022). In “Exploration and Implementation of Fashion Dress Design Based on CLO3D Technology” (2024), Hongkun Li takes a traditional dress as an example, and uses CLO3D technology to realize the virtual simulation process of the style, structure, fabric and color of the dress (Figure 11/12), and at the same time visually demonstrates the dynamic and static effects of the model's simulated fitting from multiple angles (Figure 13). This research combines virtual digital design means with fashionable dresses with cultural characteristics, and also provides new technical means for the productive protection and cultural dissemination of traditional non-heritage arts (Li,2024).

**Figure 11** Literature study of CLO3D model resizing

**Figure 12** Literature study of CLO3D virtual sewing process for dresses

**Figure 13** Literature study of CLO3D virtual display of clothing wearing effect



图2 设置人体模型的界面

图4 缝纫效果

图7 虚拟连衣裙多角度展示与动态录制

Note. Figure from (Li,2024)

Zheng Sirui and Zhang Yan in “Recovery of Tang Dynasty Women's Hu Clothing Based on CLO3D Simulation Technology and Innovative Design” proposed a method of recovering the lapel gowns worn by ladies-in-waiting in the mural paintings of the tomb of the eldest princess of Fangling in the Tang Dynasty based on digitization technology (Zheng,Zhang,2023). Firstly, we use the literature analysis method to recover the Table of the Japanese Shosoin's “Dagong Robe” costume, and apply it to CLO3D software for three-dimensional restoration (Figure 14), and then we use the SPSS data to recover the “Dagong Robe” costume by digitization

**Figure 14** Literature study CLO3D virtual dressmaking

**Figure 15** Literature study CLO3D2D windowed plate making



Note. Figure from (Zheng,Zhang,2023)

The questionnaire data was analyzed by the analysis software to derive the basis for the innovative design. The design focuses on the shoulder and lapel of the lapel robe (Figure 16), ensures the comfort of the dress through the pressure test (Figure 17), and completes the final virtual display (Figure 18). The final conclusion is that CLO3D digital restoration can restore the appearance of the ancient dress Table, which is an effective way to inherit the lapel gown

**Figure 16** Literature Study CLO3D Garment Stress Measurement

**Figure 17** Literature Study CLO3D Virtual Display Garment

**Figure 18** Literature Study CLO3D Virtual Display Garment



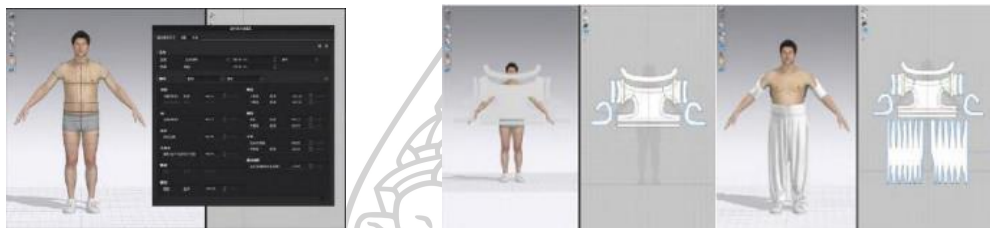
Note. Figure from (Zheng,Zhang,2023)

Duan Ting, Shi Hui, Liu Jia, Dong Qi, in “Exploration of Virtual Modeling of Mongolian Wrestling Costumes Based on CLO3D”, the cultural connotation of Mongolian wrestling costumes was explored, and the combination of traditional wrestling production techniques and modern scientific and technological means was

utilized to recover the structure of the costumes, color patterns and fabric texture, Figure 19) to obtain a digital Mongolian wrestling costume with high degree of restoration. (Figure 20), we obtained a high degree of restoration of the digital Mongolian wrestling costumes (Figure 21), the study improves the level of cultural tourism resources, and is of great significance to the dissemination of excellent national culture (Duan,Shi, Liu,Dong,2023)

**Figure 19** *Literature study of CLO3D model resizing*

**Figure 20** *Literature study of CLO3D virtual plate making and sewing process*



*Note.* Figure from (Duan,Shi, Liu,Dong,2023)

**Figure 21** *Literature Study CLO3D Virtual Display of Clothing*

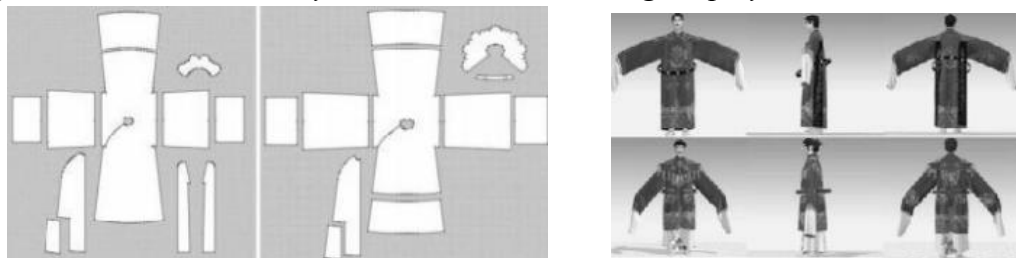


*Note.* Figure from (Duan,Shi, Liu,Dong,2023)

Lu Tingting, Yin Ling and Ren Lihong in “Digital Recovery of Python Robe of Opera Costume Based on CLO3D Technology” explored the Table of “python robe” of opera costume(Figure 22/23), based on the 3D digital recovery of typical styles through CLO3D software, which effectively develops and protects the traditional opera costume (Lu,Yin,,Ren,2022).

**Figure 22** *Literature study of CLO3D virtual plate making*

**Figure 23** *Literature Study CLO3D Virtual Clothing Display*



*Note.* Figure from (Lu,Yin,,Ren,2022)

In “3D Virtual Fitting Structure Recovery of Women’s Clothing in Mural Paintings of Tang Zhaoling”, Xiang Liu, Ruiming Wang, and Qiuyan Xu recovered the structure of the clothing by using proportional conversion and the CLO3D virtual fitting experiment method to measure and project the size of the clothing, and then carried out fitting experiments (Figure 24). The feasibility of virtual restoration is further verified through the evaluation and analysis of clothing proportion comparison, wearability, and pressure (Figure 25/26) (Figure 27). Due to the fact that there are few unearthed objects of clothing in the Early Tang Dynasty, which brings certain difficulties to the study of clothing structure, this study provides ideas and references for the study of the structure and image of women’s clothing in the Early Tang Dynasty. (Liu,Wang,Xu,2022)

**Figure 24** Literature study of women's costumes and styles in mural paintings of Zhaoling, Tang Dynasty



Note. Figure from (Liu,Wang,Xu,2022)

**Figure 25** Literature Study CLO3D Virtual Clothing Stress Measurement

**Figure 26** Literature Study CLO3D Virtual Clothing Stress Measurement

**Figure 27** Literature Study CLO3D Virtual Clothing Display



Note. Figure from (Liu,Wang,Xu,2022)

In recent years, more and more designers pay attention to combining traditional costumes with digitalization as a research idea, digital virtual display of clothing for the disappearance of traditional clothing reproduction provides an important display medium, the virtual fitting function provides a convenient way for the innovative design of clothing styles, cutting and sewing clothes without using fabrics, and

according to the human body size of the drawing of the model, in the software you can Clear and intuitive display of clothing wearing effect, saving money and the cost of materials, labor and so on.



## **CHAPTER 3**

### **RESEARCH METHODOLOGY AND PROCESS**

#### **3.1 RESEARCH DESIGN METHODOLOGY**

This study adopts a mixed research method combining qualitative research and quantitative research, with qualitative research in the Table of interviews and literature review as the main focus, and quantitative research in the Table of case studies and questionnaires as a supplement. Comprehensive and in-depth understanding of the challenges faced by the Dulong traditional dress in the process of modern development, which makes me focus on the living environment, cultural customs, and history of dress development of the Dulong people, based on the author's study of new disciplines, new technologies, new theories and techniques of clothing style design methods of the development of the modern society, and combined with the Dulong women's expectations of the Dulong traditional clothing improvement on the Dulong traditional clothing improvement, which will determine the direction of my research. Qualitative research will include interviews with four groups: Dulong women, garment pattern makers, ethnologists, and ergonomists, with the purpose of exploring different insights and perspectives at a deeper level and at the intersection of disciplines. The quantitative research includes designing and distributing questionnaires for young women and Dulong women between the ages of 18 and 23, in order to collect a wide range of opinions and feedback and to analyze young people's current clothing preferences as well as Dulong women's daily needs for clothing styles, aesthetics, cultural symbols, and other requirements.

#### **3.2 DOCUMENTARY RESEARCH METHOD**

First of all, the author collected literature on the related fields of dresses of 25 ethnic minorities in Yunnan Province, Dulong traditional culture, Dulong traditional dresses, ergonomics, and the application of CLO3D software technology, etc. The literature sources include academic journals, conference papers, dissertations, and internet resources.

Secondly, the collected literature is categorized and organized according to the topics and research contents, such as the statistical analysis of the costumes of 25 ethnic minorities in Yunnan Province, the development of the traditional culture of the Dulong people, the development of the traditional costumes of the Dulong people, the development of ergonomics and clothing, and the application of CLO3D software technology. It can also be categorized according to research methods, understand the contents of other people's research methods and tools, learn the questionnaire and interview question setting, provide theoretical support and reference for your research, and facilitate the subsequent literature review and analysis.



Finally, the author will analyze the methods, results, and shortcomings of the previous studies, identify the gaps in the literature, provide a viewpoint for the innovation of his dissertation, summarize the applicability of the previous studies and the reasonableness of the conclusions, find out the correlation with the direction of his own research, and put forward his own views and suggestions for improvement.

### 3.3 FIELD RESEARCH METHODOLOGY

First of all, the author entered the Yunnan Ethnic Museum (see Figure 28), Yunnan Ethnic Costume Museum, and Dulong Museum to examine the traditional costumes of the Dulong ethnic group, and observed and recorded the costumes of 25 ethnic minorities in Yunnan Province.

**Figure 28** *Traditional Dress of the Dulong People*



*Note.* Figure by the author

The author went into several villages (Dala Village, Kongdang Village, Xiongdang Village) near Bingzhongluo Township in Dulong Township to conduct research, observe the situation of the Dulong people wearing Dulong traditional costumes (see 29), and communicate with them briefly in order to learn about the situation of the Dulong people wearing Dulong traditional costumes, the daily life and work habits of the Dulong women as well as the demand for wearing costumes (see Figure 30), and to record the demand and expectation for their own costumes and Chinese costumes in their daily life, so as to find out the views and expectations of the Dulong people on the development of their traditional costumes. daily life, record their needs and expectations for their own clothing and Han Chinese clothing, etc., understand the Dulong people's views and expectations for the development of their

traditional clothing, and seek the problems faced by Dulong traditional clothing at present and ways to break through the problems, so as to provide an effective analysis of the dimensions of the innovative design of clothing at a later stage.

**Figure 29** *Wearing of National Dress by the Dulong People*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

**Figure 30** *Dulong Women Weaving Cloth*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### 3.4 CASE STUDY METHOD

#### 3.4.1 A CASE OF COMBINING CHINESE MINORITY COSTUMES WITH MODERN DESIGN METHODS

##### *CASE 1 ZHUCHONGYUN*

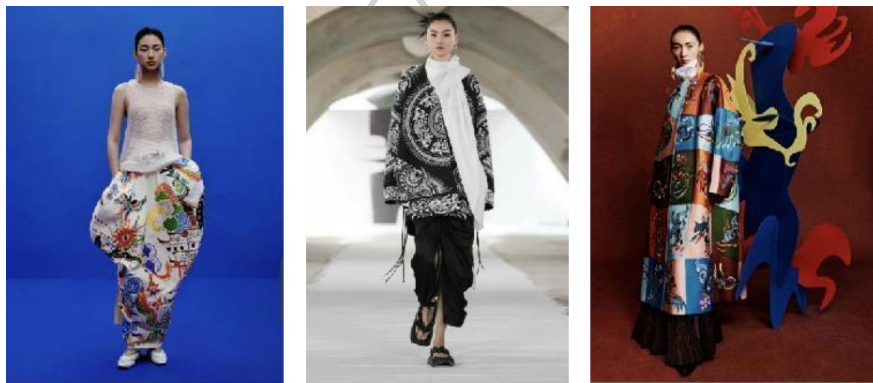
ZHUCHONGYUN was founded by Ms. Zhu Chong Yun, the founder of Maxfield Fashion Group. The brand's philosophy originates from "Great Beauty without Words, Minimalist Orientalism," which is based on the oriental mood, incorporates creative inspirations from nature, art, and philosophy, and explores a new contemporary design language in interpreting traditions. In exploring the charm of oriental civilization and national craftsmanship, the national high-fashion series "Miao" is derived.

In 2021, the brand designers visited the Miao village in Guizhou, and the designers worked with the Miao non-heritage craftsmen to carry out innovative designs on the materials, embroidery, patterns, and styles of the Miao costumes and analyzed the design of the overall and partial modeling of the costumes from the traditional culture. The Miao traditional costume structure and style focuses on the modeling of the clothing lines, covering or ignoring the human body features, and does not mainly focus on the shaping of the human body shape, but rather creates a kind of unity between the human body and the nature. The designer uses modern design techniques to make innovative designs on the patterns, structures, styles, and silhouettes of traditional Miao clothing, and the difficulty lies in solving the balance between modernity and tradition. The improved Miao clothing has minimalist lines and three-dimensional silhouettes in line with modern aesthetics and, at the same time, presents the wordless poems of Miao embroidery and ancient totems on the works. The embroidery patterns use a lot of tables and exaggeration, and the traditional techniques of Miao such as embroidery, embroidery, broken thread embroidery, etc. are integrated into the clothing, and the Miao embroidery is expressed by new technology and Miao totems are presented in the Table of embossing on the clothing with dark patterns on the leather, so as to let the world discover the unique beauty of the Miao people and pay attention to the connotations of the traditional clothing and culture of the Miao people (see Figure 31). ZHUCHONGYUN emphasizes the comfort of wearing clothes, and the brand cooperates with global natural material organizations to research and develop creative new fabrics to be applied in the design of innovative Miao clothing.

ZHUCHONGYUN "Miao" series of works until 2024 is still indifferent creation and release through the different people of ZHUCHONGYUN's Miao series of positive response can prove that the modern design methods and new technologies in the heritage and promotion of traditional national culture and clothing is a meaningful

and positive effect, but also explains that the traditional Chinese culture of modern clothing design in the creative inspiration and thinking, modern design should focus on the understanding of traditional culture based on the shape, meaning, and the spirit. At the same time, it also shows that Chinese traditional culture has deep inspiration and thinking on modern clothing design creativity, and modern design should focus on understanding traditional culture on the basis of its shape, meaning, and spirit. ZHUCHONGYUN's brand has always been sure that the combination of traditional oriental culture and modern minimalist design can not only spread the traditional culture of the nation but also bring a different spark to modern design works.

**Figure 31** ZHUCHONGYUN's Works



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

### **CASE 2 M ESSENTIAL**

M ESSENTIAL was founded in 2014, “M ESSENTIAL - all about love” aims to explore the contradiction and unity between contemporary oriental aesthetics and modern lifestyle. According to M ESSENTIAL brand founder Kai Ma: “Designers should have the responsibility of heritage when classical things are properly modernized so that it can melt into our daily life and inspire new development of the future design.” M ESSENTIAL brand through the art of fusion of traditional and modern beauty, while focusing on the material, structure, and the human body to produce a subtle relationship between the care of the human body and invisible penetration in the clothing; the brand also insists on the use of traditional materials and modern sense of the fusion of materials, and the extension of the traditional materials to research and development.

In 2022, M ESSENTIAL released a series of “The Hermit of the Western Regions”, which was based on the traditional culture and costumes of the Uyghur people, and chose the local costumes of Kashgar in the western region of the Silk Road for research and innovation; the colors still continued the style and coordination of traditional Uyghur costumes, with a high degree of saturation, and the traditional

Uyghur costumes were mainly based on the weaving, embroidery, beading, and appliqués. The brand released the Miao series “Birthday of the Moon” in Fall/Winter 2023, which used a lot of Miao silver decorations in traditional Miao costumes, and the color of the clothes was black and blue, which is used more in traditional Miao costumes, with less other saturated color decorations, breaking the stereotype of high color saturation of ethnic minority costumes in the common people’s impression. This breaks through the stereotypical impression of high color saturation in ethnic minority clothing and is more in line with the modern minimalist aesthetic feeling (see Figure 32).

M ESSENTIAL in 2016 on behalf of Asia selected INTERNATIONAL WOOLMARK PRIZE. The brand was established in a short period of more than four years, stationed in a number of major cities in the domestic well-known buyers and shop-in-shop channel, and got the United States well-known buyers Opening Ceremony favor in the United States in the United States of NY, LA, and the official online sales synchronization. It is also favored by Opening Ceremony, a famous American buyer shop, and synchronized with NY, LA, and its official website sales.

**Figure 32** *M ESSENTIAL Worksheets*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### **CASE 3 YIDPHROG MA**

Yidphrog Ma, founded in 2021 by the brand’s director, Li Yuxuan, is a designer womenswear brand that embraces Tibetan culture as its core tone. Yidphrog Ma blends Tibetan art and folklore, aiming to incorporate the spirituality and cultural connotations of Tibetan culture into the designs and concepts of each season.

The main manager interprets the traditional Tibetan culture and traditional costumes and naturally combines the colors, fabrics, and totems of the traditional Tibetan costumes with the modern costumes through modern design methods of the costumes (see Figure 33), and his works use the deconstruction and reorganization of the traditional Tibetan costumes and other design methods appropriately, and give the works an attitude of respecting the traditional Tibetan culture, and the works present

dynamic lines, and the clothes don't completely restrain the body, and don't emphasize too much on the female body curve, and present a sense of looseness, comfort and individuality. Without over-emphasizing the curves of women's bodies, it presents a sense of looseness, comfort, and individuality, using modern knitting technology to splice and collide with yak velvet, a traditional Tibetan clothing material. Based on her own understanding and experience in the design and development of yak velvet fabric, and under the premise of retaining the original qualities of yak mutton to the maximum extent possible, she creates a sense of ambiance of the clothing like the mural paintings of the Dazhao Monastery through the texture and color of the fabric. Many traditional Tibetan accessories, such as agate, red coral, turquoise, etc., are used to emphasize the beauty of the strong Tibetan culture, thus expressing the distinctive visual system of Etchuma.

Yidphrog Ma does not stick to tradition, does not follow fashion, considers every design, polishes every detail, and strives to interpret the spiritual connotation of Tibetan culture in a unique design language. Clothing is not only a carrier for people to use to table their external image and express their cultural attitudes, but it also influences and even changes their inner spirit. Through the feelings, thoughts, and insights of Tibetan culture, the mastermind has integrated its spiritual connotation into Yidphrog Ma's clothing design so that every friend who loves Tibetan culture can feel it personally.

**Figure 33** *Drawings of Yidphrog Ma's Work*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

#### ***CASE 4 SEAN SUEN***

SEAN SUEN is a clothing brand founded by Chinese designer Sun Xiaofeng in 2012 in Beijing. Sun Xiaofeng graduated from the Sichuan Fine Arts Institute. From graphic design to clothing he has a unique design concept; SEAN SUEN works in the concept of men's tailoring fused with the outline of the traditional Chinese dress and gives it a new depth, focusing on the use of the best fabrics and strive for excellence in the shape of the collection. Sun made his debut with his own label at the Spring and Summer 2016 Fashion Week in Paris.

SEAN SUEN 2023 fall/winter collection is designed in the background of Daliang Mountain, where Yi culture is dominant, and the designers have integrated the traditional culture and costumes of the Yi people in Daliang Mountain into the design of this collection through the research of the traditional culture and costumes of the Yi people in Daliang Mountain and the use of contemporary fashion tailoring techniques. The collection reinterprets the traditional Yi “piqi” silhouette and the “tuta”, a cross-body garment used to wear a sword in ancient times, with modern tailoring techniques, applying traditional Yi craftsmanship to details such as buttons and straps (see Figure 34), and using a large number of cold-weather fabrics such as leather, wool, and plush (Picture 34), which restores the traditional Yi style. The use of many leather, wool, and woolen fabrics to protect against the cold restores the original lifestyle and demands of the traditional Yi people while hoping to provide a better wearing experience for modern wearers in the bitter winter. The Daliang Mountain Yi is an ethnic group that adores black, and the use of black throughout the use of color, a small number of garments using white, and then embellished with highly saturated colors characteristic of traditional Yi clothing, the visual impact created by the clothing, and the scene of a blazing fire in the Daliang Mountain, which is full of rolling black rocks, produce a strong spiritual resonance. The accessories draw on their worship of natural spirits; the Yi people will be the sun, moon and stars, flowers, birds, grass, fish, mountains, and trees engraved on the silver jewelry, and then be a variety of good wishes, SEAN SUEN will Yi silver chest jewelry, collar jewelry innovative design added to the fall and winter series of styling, in the premise of respecting the traditional culture of the Yi people, the innovation of the modern minimalist aesthetic modeling.

Clothing is an important carrier of national culture and artistic aesthetics. The SEAN SUEN Fall/Winter 2023 collection brings the traditional Yi culture and clothing to the public's view, attracting a lot of attention and promoting the inheritance and promotion of the traditional culture and clothing of the Yi ethnic group in Daliang Mountain.

**Figure 34** SEAN SUEN's Works



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### ***CASE 5 MORIN KHUUR***

The brand MORIN KHUUR Makin was established in 2018, “MORIN KHUUR” is a Mongolian word meaning horse head qin; the brand focuses on exploring the traditional Mongolian culture and traditional clothing, etc., and passes the nomadic spirit of the Mongolian people to the public in the Table of clothing, and is committed to the inheritance and development of traditional Mongolian culture and the brand focuses on exploring Mongolian traditional culture and traditional costumes.

Mongolian robe is one of the classic traditional Mongolian clothing; the Mongolian robe’s appearance and evolution cannot be separated from the climate on the grasslands and the historical background of the Mongolian people’s old north-south conquests and nomadic migrations; the Mongolian people live on horseback, Mongolian robes can be the clothes of the day, the night can be the robes, the designers will be the Mongolian traditional clothing interpretation of a return to the essence of life’s design concepts, MORIN KHUUR simplify the complexity of the overall presentation of simple, spontaneous and nomadic genetic style. MORIN KHUUR’s Fall and Winter 2023 collection has enlarged the visual volume of the clothes and added a more neutral modern silhouette design, with a simple long line silhouette and long slanting lapels (see Figure 35), which retains and restores the traditional Mongolian dress style, with details such as buttons on the cloth bag, silver buttons, embroidery and felt hats. The details incorporate delicate elements such as cloth bag buttons, silver bead buttons, embroidered flowers, and felt hats. Using the materials of traditional Mongolian dresses and modern fabric processing techniques, the dress uses textured fabrics such as granular coarse-fiber wool, coarse cotton hand-woven fabrics, and velvet, and continues the attempts at plant dyeing with the addition of maple leaves, buttercups, five-folds, and blue dragon yarn dyeing and ready-to-wear river mud dyeing to make the overall color precipitate.

MORIN KHUUR is an admirer of natural fabrics, focusing on modified Mongolian robes as its design line and exploring new Chinese and other ethnic fabrics. Each season’s main fabrics come from handmade fabric workshops in different regions, and the brand also actively tries to develop handmade fabrics that are more in line with the brand’s tone and design inspirations with workshops that have mastered traditional ethnic weaving techniques, and most of the handwoven fabrics are made of cotton, linen, silk and wool yarns, which are very environmentally friendly. Most of the yarns used in the handwoven fabrics are made of cotton, linen, silk, and wool, which is very environmentally friendly. The materials used for dyeing are all plants themselves, and the dyeing liquid can be recycled, which is harmless to the soil.



**Figure 35** MORIN KHUUR's Works



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### **CASE 6 SARAWONG**

SARAWONG uses its own perspective to interpret Chinese elements in a new way. The design combines traditional Chinese art or Chinese opera costumes in soft colors such as pink, green, and goose yellow with modern Western sportswear and dresses in powerful silhouettes to create a dialogue between the traditional cultural art of ethnic minorities and the modern expression of the past and the present, exploring the cultural underpinnings behind the complexity of fashion.

SARAWONG A/W 2022 new Autumn/Winter collection, the background of the creation of the Tibetan people, the designer refines the colors of the Tibetan world and the colors of traditional Tibetan clothing, the continuation of the Tibetan traditional dresses of the distinctive and powerful color collision style, the Tibetan robe of the red, the sky blue, the earth's deep dark (see Figure 36), very Tibetan characteristics of the shawl, Tibetan traditional patterns and colorful tassels, combined with modern fashion silhouette and skirt, tweed fabrics and modern materials collision. SARAWONG A/W 2022 collection is included in VOGUE RUNWAY and presented in Milan. This season's SARAWONG A/W 2022 collection is not only included in VOGUE RUNWAY but also held an offline presentation at Acquario Civico in Milan.

**Figure 36** SARAWONG Fall/Winter 2022 Collection Artworks



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

In the SARAWONG A/W 2022 Spring/Summer collection, SARAWONG extracts the colors, pattern symbols, and craftsmanship precipitated from the traditional cultural system of the Hmong people and integrates modern deconstruction and reorganization of the design method; the whole collection is innovatively designed based on the contours of the traditional Hmong clothing. The traditional Miao costumes are famous for their bright colors, and the designers organize the extracted colors into bold colors such as bright pink, polka dots, bright yellow, and blue-green through modern aesthetics. In terms of styling and craftsmanship, the press pleat craft of the traditional Miao costumes continues to recreate the traditional pleated skirt styling of Miao costumes (see Figure 37), and the structure combines the modern low-waisted version, shawl, and modern silhouettes with a sense of movement, and in terms of the clothing materials, SARAWONG experimented with the use of modern deconstruction and restructuring. In terms of materials, SARAWONG experiments with different fabrics and explores the results of the collision between traditional culture and modern technology.

**Figure 37** SARAWONG Spring/Summer 2022 Collection Artworks



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### **CASE 7 ANGEL CHEN**

ANGEL CHEN is a pioneering Chinese designer brand founded by Angel Chen in 2014. With a core philosophy of fusing Eastern and Western aesthetics, ANGEL CHEN is stocked in over 100 international retailers including Lane Crawford, NET-A-PORTER, Galeries Lafayette, Selfridges, Luisa Via Roma, and Urban Outfitters, and is part of a new wave of young Chinese brands that are influencing the world. CHEN is part of a new wave of young Chinese brands that are influencing the world; ANGEL is embarking on a new journey to explore the beauty of traditional Chinese craftsmanship and modern design thinking.

ANGEL CHEN Fall/Winter 2022 collection is designed in the Inner Mongolia grassland of China, based on the traditional Mongolian culture and Mongolian

traditional costumes of which the “Prestige Ceremony” series consists of 16 sets of costumes handmade by non-genetic inheritors in Inner Mongolia. The “Prestige Ceremony” series consists of 16 sets of costumes, which are handmade by Inner Mongolia’s non-hereditary inheritors, based on the traditional Mongolian fabrics, craftsmanship, colors, silhouettes, and structures, and modernized, restoring the spirit of the traditional costumes of Balkhoo, Uzhumqin, Ordos, Kalka, Bakelite wrestling and shamanic costumes. “Epic of Savanna” Grassland Legend Series is a collection of collector-grade apparel with unique brand aesthetics and national culture, inspired by the peace and love depicted in the calligraphy of the Mongolian people, the koan crowns symbolizing women’s social status, and the living beings, customs, cultures, and colors of this land. In terms of materials and craftsmanship, traditional crafts such as 10,000-needle embroidery and grass and wood dyeing are used (see Figure 38), and a magnificent painting with the spirit of horse-racing is created by a Chinese painting artist to be presented on the dress.

**Figure 38** *ANGEL CHEN Fall/Winter 2022 Collection Artworks*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

### ***CASE 8 LAWRENCE HSU’S BUTTERFLY***

Designer Lawrence Hsu, Better known as Xu Jianshu, and Poly-China Silk Group joined forces to present the closing show of Beijing Fashion Week 2021 on September 26th, 2021, in Wangfujing, the “First Street of China’s Commerce.”

The show’s theme was based on the traditional culture of the Miao people, and the legend of “Mother Butterfly” is also circulated in the Miao folklore, and in their cognition, the ancestors of the Miao people are the embodiment of butterflies. The show showcased 48 sets of costumes, all of which were created using Miao embroidery techniques, with some of the motifs being created using batik techniques, making full use of traditional Miao clothing pattern handicrafts such as Miao tin embroidery, Miao brocade, Guizhou batik, and so on (see Figure 39), and French embroidery techniques to decorate the rhinestones, and the leather also embodies

batik printing designs, in addition to which the works also incorporate modern In addition, the work also combines modern tailoring techniques, using completely westernized three-dimensional tailoring to innovate the silhouette and structure of the traditional Miao clothing, demonstrating the design concept of combining the traditional techniques of China's ethnic minorities with the modernization of Western craftsmanship.

**Figure 39** *Lawrence Hsu's Works*



*Note.* Figure from the Internet  
<https://www.xiaohongshu.com/>

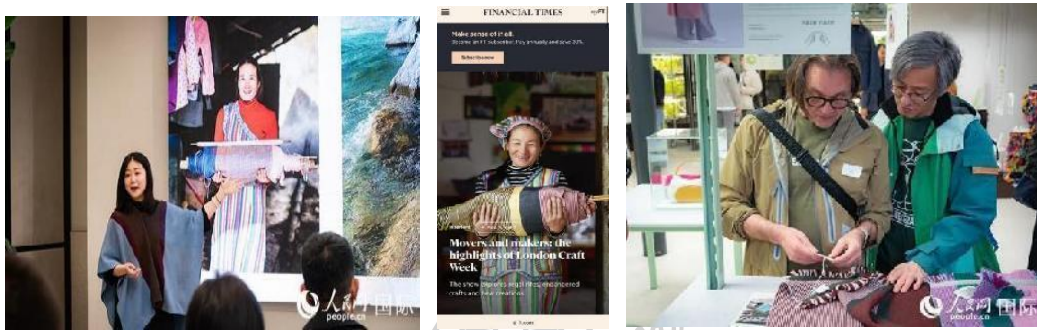
### ***CASE 9 NAZE NAZE***

In 2015, Beijing Contemporary Art Foundation (BCAF) and Klee Klee, a sustainable brand of Suran Clothing Company, launched the “Development and Preservation of Ethnic Minority Cultures in China - Naze Naze Dulong” project, a program that links folk handicrafts with innovative enterprises to develop new products that meet today's aesthetics and needs using contemporary art and design methods. Naze Naze draws from the culture of the Dulong people, combining contemporary aesthetics and color palettes with traditional Chinese fabrics to create innovative, well-crafted products that meet today's aesthetics and needs. In November 2021, Naze Naze was sold for the first time overseas (see Figure 40), at the New York boutique store Sage Collective, and the Dulong blanket officially “went to sea” and went global. Now the Dulong fabric project has reached its sixth phase, with 38 Dulong women participating in the production (see Figure 41), and the project's products are also selling well in stores and are loved by local customers in New York (see Figure 42). Ye Feng mentioned that customers who buy Naze Naze products at Sage are interested in the products themselves and support the concept of social welfare and sustainable development. Customers like to learn about the artisanal spirit behind Naze Naze products and the related human stories.

**Figure 40** Overseas representatives of Naze-Naze Project Presenting Their Works at the Sharing Session

**Figure 41** Dulong Weavers Featured in a Special Edition of London Crafts Week Published in the Financial Times.

**Figure 42** Visitors Enjoying the Naze-Naze-London Crafts Week Display



Note. Figure from the Internet

[人民网 网上的人民日报 \(people.com.cn\)](http://people.com.cn)

The study analyzed a number of brands over the past three years and identified nine brands that strongly influence the promotion of traditional Chinese minority cultures and costumes. From the analysis of several case studies, it was found that while people from all walks of life are pursuing economic and technological development, there are also many designers who are pursuing their cultural and spiritual roots, and are also committed to integrating excellent minority cultures, costumes and crafts into modern social aesthetics and technological technology, so as to achieve the purpose of inheriting the cultures of China's ethnic minorities in keeping with the times, under the leadership of the brands and designers, people from all walks of life have paid attention to the cultures of China's ethnic minorities in turn, and have been able to promote the culture of ethnic minorities. Under the leadership of the brand and designers, people from all walks of life in society have paid close attention to the culture of Chinese minorities and felt the shock by different beliefs, customs, and aesthetics of Chinese minorities.

When I searched for brands and products related to Dulong traditional culture and clothing, I found that almost no designers paid attention to Dulong traditional culture. The above case, Naze Naze, mainly researches and develops the rest of the products for the Dulong carpet, for example, handbags, pillowcases, and furniture items, which is very different from the direction of the author's research. The author researches and innovates the wearing of tables and silhouettes of traditional Dulong costumes based on the one-piece clothing structure of the "Dulong blanket".

### **3.5 LONG-TERM SUSTAINABILITY**

The integration of modern technologies and materials into Dulong traditional costumes presents a unique opportunity to foster long-term sustainability. This section expands on the methodologies employed to assess the environmental impact and the community's long-term acceptance of these innovations, with a particular focus on the sustainability assessment of materials and technologies used in garment production.

#### **3.5.1 ASSESSING THE ENVIRONMENTAL IMPACT OF INNOVATIONS**

The introduction of new materials and technologies in the production of Dulong traditional costumes allows for a comprehensive reassessment of the environmental impact. The lifecycle of these materials, from sourcing to disposal, must be considered to ensure minimal ecological disruption. This includes evaluating the energy required for their production, the potential for recycling, and the longevity of the materials to reduce waste.

#### **3.5.2 COMMUNITY ACCEPTANCE AND CULTURAL INTEGRATION**

For the Dulong community to embrace modernized practices, it is essential to engage in dialogue about the integration of new materials and technologies that align with their cultural values and environmental principles. This dialogue should extend to discussing the lifecycle benefits of these materials, such as reduced environmental impact and increased durability, which can contribute to the preservation of cultural heritage while adapting to contemporary lifestyles.

#### **3.5.3 DURABILITY OF NEW MATERIALS**

The durability of new materials is paramount to their sustainability. Research will evaluate the longevity and resilience of these materials, ensuring they can withstand daily use without compromising the cultural integrity of the costumes. Preference will be given to materials with a reduced ecological footprint and those derived from sustainable sources.

#### **3.5.4 ECOLOGICAL FOOTPRINT OF NEW MANUFACTURING PROCESSES**

The ecological footprint of new manufacturing processes must be measured against traditional methods to ensure that modernization efforts contribute positively to the environment. This includes assessing the carbon footprint of production, energy efficiency, and waste reduction, with the aim of identifying processes that enhance production while minimizing environmental impact.

### **3.5.5 ECONOMIC VIABILITY AND SUSTAINABILITY**

The economic implications of sustainability are crucial in the modernization of Dulong traditional costumes. A cost-benefit analysis of sustainable materials and the economic benefits of new technologies will be explored. This analysis will consider the total cost of ownership, including production, maintenance, and disposal, to present a sustainable model that supports the Dulong community's economic growth while preserving its cultural heritage.

### **3.5.6 CULTURAL PRESERVATION AND ENVIRONMENTAL RESPONSIBILITY**

Cultural preservation and environmental responsibility are intertwined, particularly in the context of Dulong traditional costumes. Strategies will be proposed that integrate cultural motifs and symbols into modern designs, ensuring the essence of Dulong heritage is preserved while adopting environmentally sound practices.

## **3.6 VISIT AND DISCUSS**

In one-third of the writing of this research article, some new questions were raised, and it was necessary to interview the Dulong women to get new directions and answers for the research. Because of time and geographic constraints, I took the online interview method to conduct in-depth interviews with the Dulong women to understand the needs and expectations of Dulong women for Dulong traditional clothing in terms of functionality, style, color, and so on. and expectations.

### **3.6.1 STUDY POPULATION AND SAMPLE**

#### **(1) Dulong women**

In this study, we chose 8 women from Dala, Kongdang and Xiongdang villages in Bengzhongluo Township of Dulongjiang Township as the main online interviewees. Most of the young people in the villages where the Dulong live have gone out to work, and only a small number of the old people and women remain in the villages. Because the Dulong people talk in Dulong, only 8 women were found to carry out the interviews due to the difficulties of the language interference. Because the Dulong are located in very remote and distant mountain villages in China, I chose to use online interviews because of the conflict of time and geography. This time, I checked the contact information of the Dulong-related people on some social software, and for the first time, I contacted the son-in-law of a well-known surviving Dulong Wenmian man who lives in the village named Dala next to the town of Bengzhongluo. We communicated by telephone and video three times, and he introduced me to three Dulong women in the same village after understanding my purpose. After several

telephone interviews, the Dulong women warmly recommended other women from nearby villages to participate in the online interview, and it was only in the conversations with the Dulong women that I really understood the current situation of the Dulong traditional clothing and the existence of the essential problems. By setting Dulong women as the main interview subjects, this study was able to find hidden problems in the target population.

#### (2) Pattern maker

In this study, a clothing design industry in Yunnan Province has selected a clothing pattern research qualification of many years, through their many years of clothing pattern research work, in-depth discussion of the Dulong traditional clothing problems, as well as the study of clothing structure style improvement in the demand and face the difficulties, through the exchanges and discussions, and finally they put forward part of the Dulong traditional clothing structure style innovation design. Through exchanges and discussions, finally, they put forward some innovative designs of Dulong traditional clothing structures and styles, which provide the author with design ideas and thoughts for reference in this research.

#### (3) Master

Interviews were conducted with two experts in ethnology and ergonomics. The interview with the ethnology expert can deeply understand the feasibility of improving the Dulong clothing in terms of national culture inheritance and promotion, as well as avoiding the occurrence of national culture appropriation; the interview with the ergonomics expert can deeply learn and understand the relationship between ergonomics and clothing, laying a certain amount of theoretical knowledge of ergonomics for the later stage of this research, as well as understanding the need to pay attention to matters and requirements and principles of designing clothing. The interviews with the experts provided me with an in-depth understanding of the relationship between ergonomics and clothing. The expert interviews provide theoretical learning and support for my research.

#### (4) Summary

The first interview group is for Dulong women; the main purpose is to understand the significance of Dulong traditional costumes to Dulong people and Dulong women's ideas on the improvement of Dulong traditional costumes; the second interview group is for ethnologists; the purpose is to understand the impact of the change of Dulong traditional costumes to Dulong people and the impact on the inheritance of the Dulong traditional culture; the third interview group is for ergonomics experts, the purpose is to understand the importance of ergonomics to clothing design and to learn more about the theoretical knowledge of ergonomics to understand the various links between the human body and clothing. The third interview group is for ergonomics experts, with the purpose of understanding the importance of ergonomics to clothing design learning more about the theoretical



knowledge of ergonomics, and learning to recognize the various connections between the human body and clothing; the fourth interview group is for clothing pattern makers, with the purpose of understanding the feasibility of modernizing and improving the innovative design of the Dulong traditional clothing, which is called “one-piece style”. The fourth interview group is for the clothing pattern maker, with the purpose of understanding the feasibility of modernizing and improving the innovative design of the Dulong traditional clothing, as well as the auxiliary software and technology that can be used in the improved design of the clothing structure.

The steps are as follows:

- (1) Identification of research questions through fieldwork;
- (2) Defining research objectives through questions;
- (3) Adoption of the question of the purpose-drafting research tool;
- (4) Ask the instructor to review the research tool’s questions for reasonableness and results for the purpose of the research;
- (5) Revise research tools based on questions posed by the mentor.

### **3.6.2 DATA ANALYSIS**

The analysis of qualitative data mainly adopts the content analysis method, in which the author interviews Dulong women, clothing pattern makers, ethnologists, and ergonomists, records observations, and discussion results and organizes them into comparable data, conducts content analysis and problem summarization, and excavates Dulong women’s needs and expectations for traditional clothing.

#### **(1) Collect data**

The feedback was collected through a comprehensive survey and a series of in-depth interviews with Dulong women, pattern makers, and cultural experts. The data gathered was meticulously categorized based on comfort, functionality, aesthetic appeal, cultural significance, and ergonomics themes.

#### **(2) Influence on design decisions**

**Comfort and Ergonomics:** The feedback emphasized the need for comfortable garments that accommodate daily activities. Analysis of the responses revealed a preference for materials with a softer hand feel and better breathability. Consequently, the design decisions included the selection of fabrics that provide comfort while maintaining the integrity of traditional weaves.

**Functionality and Usability:** Community members highlighted the importance of functional clothing that adapts to various occasions. The analysis showed a desire for multipurpose designs that transition seamlessly from casual to formal settings. This insight led to the introducing convertible elements in the costume design, allowing for different wear configurations.

**Aesthetic Preferences:** The questionnaires and interviews provided insights into the community’s aesthetic preferences. Many respondents favored contemporary

silhouettes that also respect traditional Dulong aesthetics. This feedback influenced the design decision to integrate modern cuts with traditional patterns and color palettes.

**Cultural Preservation:** The community expressed a strong attachment to cultural motifs and symbols. The analysis of this feedback led to the preservation and reinterpretation of traditional elements in the costume design. For instance, the incorporation of the Dulong's signature stripes in a modern context ensures cultural continuity.

**Innovation and Modernity:** While respecting tradition, the community also showed openness to innovation. The feedback analysis indicated a willingness to embrace new design techniques and materials that reflect contemporary lifestyles. This has informed the decision to use modern fabrication methods that maintain the essence of traditional craftsmanship.

**Sustainability and Environmental Considerations:** The community's feedback underscored the importance of sustainability. The analysis showed a preference for designs that minimize environmental impact, leading to the use of eco-friendly materials and processes in the design and production of the costumes.

**Community Involvement:** The feedback consistently highlighted the desire for community involvement in the design process. A collaborative approach was adopted to honor this, inviting community members to participate in design workshops and provide real-time feedback on prototype garments.

### (3) Integration and iteration

The feedback analysis was not a one-off process but an iterative one. The insights gathered were continuously integrated into the design process, allowing for multiple rounds of refinement. This approach ensured that the final designs were innovative and resonated with the community's cultural identity and practical needs.

## **3.7 WIDER COMMUNITY INVOLVEMENT**

To ensure a holistic and inclusive approach to the modernization of Dulong traditional costumes, it is essential to expand the study's participant selection beyond the input of Dulong women. This section outlines a research methodology aimed at involving a broader spectrum of the community, including elders and men, to gain a comprehensive understanding of the community's reception of the changes.

### **3.7.1 RESEARCH METHODOLOGIES FOR WIDER COMMUNITY INVOLVEMENT**

The following methodologies will be employed to achieve wider community involvement and systematically incorporate feedback into design iterations:

(1) **Structured Community Workshops:** Organize workshops that provide a platform for community members to engage directly with design prototypes. These

workshops will be structured to allow participants to interact with the designs, suggest modifications, and discuss the cultural significance and practicality of various design elements.

(2) Feedback Sessions Post-Prototype Testing: After prototypes have been tested for functionality and comfort, feedback sessions will be conducted to gather detailed insights from the community. These sessions will be focused on specific aspects of the prototypes, such as fit, comfort, cultural appropriateness, and aesthetic appeal.

(3) Direct Influence on Design Modifications: Establish a clear protocol for how feedback from workshops and testing sessions will be documented, analyzed, and translated into design modifications. This process will ensure that community input directly influences the evolution of the costume designs.

(4) Iterative Design Process: Implement an iterative design process where each cycle of community feedback leads to tangible changes in the prototypes. This iterative approach will be transparent, with community members being informed of how their feedback has been applied.

(5) Community Review Panels: Form review panels consisting of community representatives to provide ongoing oversight of the design process. These panels will meet regularly to discuss the progression of designs and ensure that community perspectives are consistently integrated.

(6) Transparent Communication: Maintain open lines of communication with the community throughout the design process. Regular updates will be provided on the incorporation of feedback, and opportunities for further input will be offered at key stages.

(7) Documentation and Archival: Keep a detailed record of all community feedback and the resulting design modifications. This documentation will serve as a transparent archive of the community's contribution to the modernization process.

### **3.7.2 IMPORTANCE OF DIVERSE PERSPECTIVES**

Including elders and men is particularly significant due to their distinct roles within the Dulong community. As custodians of traditional knowledge, elders can provide invaluable insights into the cultural significance of traditional costumes and the implications of modernization. Men, who may have different daily interactions with cultural attire, can offer perspectives on practicality and functionality.

### **3.7.3 ANALYZING COMMUNITY RECEPTION**

The research will analyze the community's reception towards the modernization of traditional costumes by examining various factors, such as:

- (1) The perceived impact on cultural identity and heritage.
- (2) The balance between tradition and modern aesthetics.

- (3) The potential effects on social status and gender roles.
- (4) The economic implications for local artisans and the community.
- (5) Integrating Findings into Design Process

The findings from the wider community involvement will be integrated into the design process, ensuring that the modernized costumes reflect the collective aspirations and concerns of the Dulong people. This iterative approach will allow for continuous refinement of the designs based on community feedback.

### **3.8 POLL**

Through the interviews with Dulong women, clothing pattern makers, ethnologists, and ergonomists and the results of the interviews, the author made a questionnaire on the clothing preferences of Dulong women, which was distributed to Dulong women between the ages of 18-25, in order to analyze a large number of Dulong women's data to find out their body types, occupations, postures, and ideas for improving the colors and styles of traditional Dulong clothing. The purpose of the survey is to analyze a large amount of data from Dulong women in order to find out their body type, occupation, daily posture, color, and style improvement ideas of Dulong traditional clothing, and to make sure that this study involves the participation of Dulong community and provides a directional guidance for the improvement of the structure and style of Dulong traditional clothing at a later stage, with an expectation of 150 copies to be recovered.

While the research has diligently sought the opinions of Dulong women, it is crucial to consider the perspectives of other demographic groups within the community to understand the community's acceptance of the modernization of traditional attire. Expanding the participant pool to include elders and men is essential for garnering diverse viewpoints on the proposed changes to the Dulong traditional costumes. Including additional community members aims to capture a holistic representation of the Dulong people's sentiments toward modernizing their traditional costumes. This approach ensures that the research findings are not only rich in cultural context but also reflective of the collective voice of the community.

The methodology for expanding the participant selection involves the following strategies:

(1) Inclusive Sampling: The research will actively seek to include elders and men in the survey process, ensuring that the demographic makeup of the sample is representative of the broader community.

(2) Community Forums: Public forums will be organized to provide a platform for open dialogue, inviting community members of all ages and genders to express their opinions and concerns regarding the modernization efforts.

(3) Interviews: Semi-structured interviews will be conducted with elders and male community members to delve deeper into their insights and attitudes toward the changes in traditional clothing.

(4) Participatory Observation: Participatory observation during community events will offer a first-hand understanding of the social dynamics at play and how these might influence the acceptance of modernized costumes.

(5) Collaborative Design Sessions: Community members will be invited to contribute to the design process through collaborative workshops, allowing for direct input into the creative development of the costumes.

The interviews and surveys with elders and men have yielded valuable insights. Many respondents desired to see their traditional costumes evolve while retaining the essence of their cultural heritage. They acknowledged the importance of adapting to contemporary lifestyles while valuing tradition's significance.

Elders within the community have shown a keen interest in ensuring that modernization respects the wisdom of the past and maintains the cultural narrative embedded in the traditional costumes. They have offered guidance on how to balance innovation with the preservation of cultural symbols.

Male participants have provided a perspective emphasizing practicality and functionality, suggesting that modernized costumes should be comfortable, suitable for daily wear, and resonate with the Dulong identity.

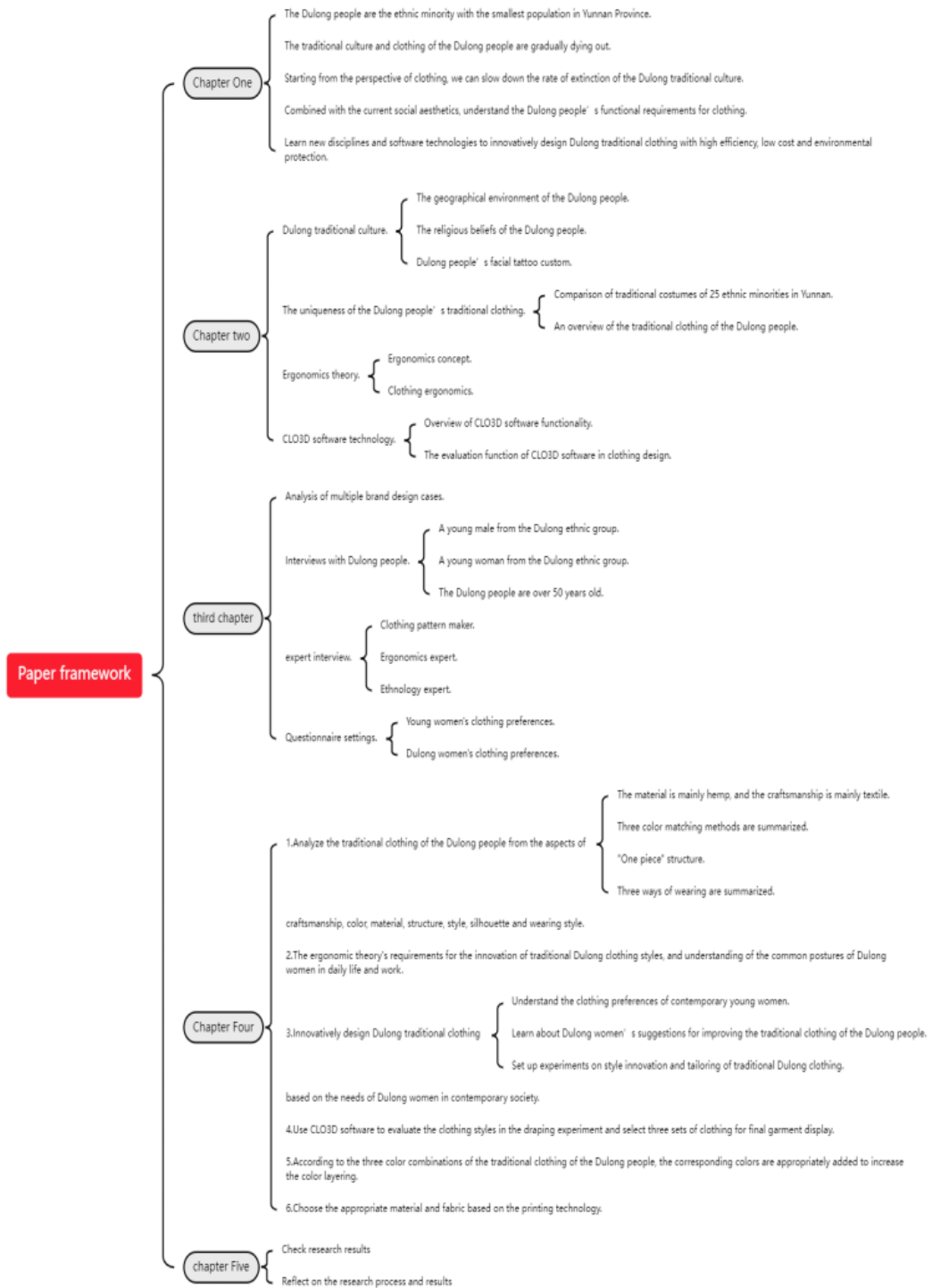
The feedback from the expanded participant pool indicates a general openness to the modernization of traditional costumes, provided that the changes are sensitive to cultural values and are aesthetically pleasing. The community has shown a willingness to embrace designs that reflect a fusion of the old and the new, as long as the integrity of their traditional attire is upheld.

### **3.9 DESIGN PROCESS**

On the basis of obtaining a breakthrough in the innovative design of Dulong traditional clothing, I will next begin the innovative design of Dulong traditional clothing, including demand analysis, conceptual design, sketching, stand-up cutting experiment, CLO3D clothing evaluation, and garment production. During the design process, I will fully consider the needs and expectations of the women who raise the Dulong ethnic group and listen to the advice and guidance of pattern makers, ethnologists, ergonomists, and designers to ensure the fit, comfort, and functionality of the garments.

### 3.10 THESIS FRAMEWORK

Figure 43 Thesis Framework



Note. Figure by the author

### 3.11 SUMMARY OF THE CHAPTER

The research methodology in this chapter thoroughly explores this study's design and implementation. A mixture of qualitative and quantitative research methods was used to gain insights into the causes of the demise of the development of Dulong traditional dress culture and the needs and expectations of Dulong women for Dulong traditional clothing. Qualitative data collection used observation methods, in-depth interviews, and group discussions, which led to an understanding of the current situation of the development of Dulong traditional clothing as well as the Dulong community's and Dulong women's suggestions and perceptions of the innovation and design improvement of Dulong traditional clothing; quantitative data collection included questionnaire surveys and field observations, which provided specific data support for the design. In the data analysis stage, content analysis, statistical analysis, and comparative analysis were used to interpret the data further and provide strong data support for the innovative design of Dulong traditional clothing. The design process will be based on the research results to ensure the design of clothing that meets the needs of Dulong women. A solid theoretical and practical foundation has been laid for this study by synthesizing different research methods.



## **CHAPTER 4**

### **RESEARCH PROCESS**

#### **4.1 DIRECTION OF MODERNIZATION AND IMPROVEMENT OF DULONG TRADITIONAL CLOTHING**

##### **4.1.1 ANALYSIS BASED ON NATIONAL GOVERNMENT POLICY**

In 2017, led by the Provincial Institute of Standardization and developed in cooperation with the Provincial Department of Culture, the Provincial Intangible Cultural Heritage Protection Center, and the cultural management departments of relevant counties and districts, a total of more than 20 units excavated and reproduced the 15 endemic Brown, Dai, Hani, Lahu, Lisu, Naxi, Achang, Bai, De'ang, Dulong, Jinuo, Jingpo, Nu, Pumi, and Wa ethnic minorities in Yunnan Province. The traditional production techniques and core cultural elements of the costumes of these ethnic minorities are a way to protect the costume culture of these ethnic minorities. The Provincial Institute of Standardization and other departments have actively explored and innovated the protection and inheritance methods of minority dress culture, implemented the standard enhancement action for tourism and cultural industry, and carried out in-depth research and development of local standards for 15 unique minority dresses in Yunnan Province over a period of three years, providing a basis for the unique minority dresses in Yunnan Province in the areas of production, teaching, publicity, tourism product development, cultural and artistic performance, etc., and further promoting the protection and inheritance of minority dress culture. Minority dress culture protection and inheritance.

On October 9, 2020, in the Implementing Opinions of the Yunnan Provincial People's Government on Implementing the Opinions of the State Council on Further Prospering and Developing the Cultural Affairs of Ethnic Minorities, issued by the Yunnan Provincial Ethnic and Religious Affairs Commission, the Article 13 reads: "Strengthening the rescue, protection, and inheritance of the cultural heritage of ethnic minorities". Article 14: Respecting and promoting the outstanding traditional cultures of minority nationalities. Research into the characteristics and laws of minority cultures is being strengthened, and effective ways of promoting outstanding traditional minority cultures, such as educational transmission and the promotion of social transmission, are constantly being opened up. Article 17: Efforts shall be made to promote foreign exchanges of minority cultures, and to enhance further the international influence of minority cultures in the province. Article 25: Strengthening the financial guarantee for developing ethnic minority cultural endeavors. Governments at all levels shall continuously increase funding to develop ethnic minority cultural endeavors. From 2010 onwards, 20 million yuan per year will be



allocated to the rescue and protection of the traditional cultures of the 25 hereditary ethnic minorities at the provincial level in the ethnic work departments.

On September 2021, Yunnan Provincial Ethnic and Religious Affairs Commission issued a reply to Proposal No. 0186 of the Fourth Session of the Twelfth CPPCC Yunnan Provincial Committee, in response to the proposal of “Strengthening the Inheritance and Innovation of Ethnic Minority Clothing in Yunnan”, the reply noted as the following: first, by carrying out apprenticeships and teaching, inheritance training, activity display, product research and development and other ways, it effectively promotes the inheritance of the excellent traditional handicrafts of various ethnic groups and carries forward. At the same time, the development and growth of national costume cultural enterprises emerged in Chuxiong Yi Family Commune National Culture Development Co., Ltd. and Dayao County Miyilu National Costume Products Co. At present, the province has a total of 11 ethnic clothing above-scale cultural enterprises. Second, the company should highlight the traditional characteristics to adapt to consumer demand recommendations. Third, on strengthening talent training, incentives for practice, and innovation. With the relevant departments to continue to promote the cultural heritage of ethnic minorities and innovation in the training of various types of talent. 4, to support the digital means of knowledge mapping, user profiles, and other modern technologies applied to ethnic minority dress information storage and utilization, the construction of ethnic minority cultural resources database, ethnic minority dress culture into “living data”.

#### **4.1.2 ANALYSIS BASED ON LITERATURE REVIEW**

The author reviewed the literature on Dulong traditional culture and dress and summarized and analyzed the research gaps of Dulong traditional dress culture, i.e., the structural style of Dulong traditional clothing is lagging behind, which doesn't confirm the aesthetics of the current social development and is inconvenient to wear on a daily basis, which is one of the main reasons leading to the imminent extinction of the Dulong traditional dress culture. Then, the author searched the literature and research development related to human clothing engineering and CLO3D software, considering the new disciplines and technologies developed in the current society. After organizing the literature review, the literature guided the author to study the theory of human clothing engineering and the application of CLO3D software to test the function of clothing and study the innovative design of Dulong traditional clothing.

#### **4.1.3 ANALYSIS BASED ON CASE STUDIES**

Through the case study in Chapter 3, the author found that through the in-depth understanding of an ethnic group, including cultural beliefs, living habits, geographic

environment, dress culture, etc., extracting the ethnic group's cultural characteristics, dress features (including colors, patterns, silhouettes, structural styles, etc.), and combining them with the modern society's design methods to give the ethnic group's clothing more possibilities for wearing, on the one hand, it can increase the ethnic group's attention in the process of social development. On the one hand, it can increase the attention of this ethnic group in the process of social development; on the other hand, the in-depth study of ethnic costumes can add inspiration for modern design.

According to the second chapter of the Dulong literature review of the Dulong people in the current social process of the Dulong clothing culture in the dilemma, according to the case study analysis results to guide the author, in-depth study of the Dulong traditional clothing, extracting the characteristics of the Dulong traditional clothing, combined with the current modern design methods and technology of the traditional clothing of the Dulong people to provide more possibilities of wearing, to reduce the Dulong culture, clothing, the speed of the extinction of the Dulong people.

#### **4.1.4 ANALYSIS BASED ON INTERVIEW FINDINGS**

According to the results of online interviews with Dulong women, the author found that the reasons affecting Dulong women's wearing of Dulong traditional clothing are as follows: first. Many young Dulong women do not wear Dulong traditional clothing, so they do not want to wear it themselves; second. Modern Han Chinese clothing is more convenient to wear than Dulong traditional clothing, and the styles and colors are better than those of the Dulong traditional clothing; third, A piece of Dulong blanket on the body simply winding draped wearing way will lead to clothing on the body cannot be fixed, there will be the risk of going naked, as well as inconvenient daily work and travel.

The interviews with Dulong women gave the author direction and new ideas for improving traditional clothing. This research needs to improve traditional clothing that does not conform to the human body and is inconvenient for daily work and travel. It should also combine current design methods to adapt traditional clothing to modern aesthetics.

Analysis based on the results of the questionnaire.

The author set up a questionnaire for Dulong women on their clothing preferences, and after two revisions of the questionnaire and two distributions of the questionnaire, based on the feedback from Dulong women on the questionnaire, the author analyzed the following points from the questionnaire:

(1) Most Dulong women no longer wear traditional Dulong clothing daily (see Figure 44).

**Figure 44** Data on the Survey Results of the Questionnaire of Dulong Women

7、您每天通常穿什么类型的衣服? [单选题]

选项	小计	比例
A、独龙族传统服装	9	9.28%
B、现代汉族服装	79	81.44%
C、两者结合	9	9.28%
本题有效填写人次	97	

(2) Most Dulong women are dissatisfied with the current style and design of traditional Dulong clothing (see Figure 45)

**Figure 45** Data on the Survey Results of the Questionnaire of Dulong Women

10、您对目前独龙族服装的款式和设计是否满意? [单选题]

选项	小计	比例
A、满意	13	13.4%
B、不满意	58	59.79%
C、一般	26	26.8%
本题有效填写人次	97	

(3) 58.76% of Dulong women believe that the function of Dulong traditional clothing does not satisfy their daily work and travel, and only a very small number of Dulong women believe that the wearing of Dulong traditional clothing does not affect their daily work and travel, accounting for only 12.37% of the data from this questionnaire survey (see Figure 46).

**Figure 46** Data on the Survey Results of the Questionnaire of Dulong Women

11、您觉得目前的独龙族服装款式足以满足您的日常出行和活动的的需求吗? [单选题]

选项	小计	比例
A、满足	12	12.37%
B、不满足	57	58.76%
C、一般	28	28.87%
本题有效填写人次	97	

(4) With regard to traditional Dulong clothing, most Dulong women prefer to improve the traditional Dulong clothing by adding modern elements to the design, with the data accounting for 80.41% of the data survey (see Figure 47).

**Figure 47** Data on the Survey Results of the Questionnaire of Dulong Women

9、对于传统独龙族服装, 您更喜欢: [单选题]

选项	小计	比例
A、保持传统风格	19	19.59%
B、注入现代元素进行改良设计	78	80.41%
C、其他 (请注明) [详细]	0	0%
本题有效填写人次	97	

(5) Most Dulong women believe that it is important for them to embody traditional cultural elements while considering their daily wear and that this is what they need so far (see Figure 48).

**Figure 48** Data on the Survey Results of the Questionnaire of Dulong Women

14、您认为对于独龙族服饰来说, 体现传统文化元素又兼顾日常穿着是是否重要? [单选题]

选项	小计	比例
A、是	76	78.35%
B、否	21	21.65%
C、没感觉	0	0%
本题有效填写人次	97	

(6) Most Dulong women would like to see any specific style or design incorporated into Dulong traditional clothing to better suit their preferences and lifestyles, with the data accounting for 81.44% of this questionnaire (see Figure 49).

**Figure 49** Data on the Survey Results of the Questionnaire of Dulong Women

14、您认为对于独龙族服饰来说, 体现传统文化元素又兼顾日常穿着是是否重要? [单选题]

选项	小计	比例
A、是	76	78.35%
B、否	21	21.65%
C、没感觉	0	0%
本题有效填写人次	97	

(7) In Dulong traditional clothing, the majority of Dulong women believe that what affects their wearing comfort is the style of Dulong traditional clothing, with 74.23% of the data from this questionnaire survey, and only a small number of Dulong women believe that what affects their wearing comfort is the material of the fabrics, with 25.77% of the data from this questionnaire survey (see Figure 50).

**Figure 50** Data on the Survey Results of the Questionnaire of Dulong Women

19、独龙族传统服装哪些因素会影响您的着装舒适度? [单选题]

选项	小计	比例
A、款式 (合身性)	72	74.23%
B、面料 (透气性)	25	25.77%
本题有效填写人次	97	

The results of the questionnaire on the clothing preference preferences of Dulong women guided the author that it is necessary to study the structure style and color of Dulong traditional clothing to ensure that the characteristics of Dulong traditional clothing can be correctly retained in the improved design, and on this basis, to solve the problems of the clothing not being well-fitting as well as the clothing not being able to meet the daily work and travel.

## 4.2 CHANGES IN THE CRAFTSMANSHIP AND MATERIALS OF DULONG TRADITIONAL COSTUMES DURING THE SOCIAL PROCESS

### 4.2.1 RHEOLOGY OF PROCESSES AND MATERIALS

The materials used for making Dulong costumes are generally divided into two categories: the first is the materials used for weaving costumes, and the second is the materials used for the colors on the costumes. Dulong traditional clothing materials are generally use hemp, hemp fiber thickness, and length and cotton is extremely similar to the cell wall is not lignified, so it can be used as raw materials for textiles; the textile fabrics wear-resistant; at the same time the warmth of winter and summer cool, insect-proof mildew resistant function, the Dulong traditional clothing is rarely used to produce animal fur, most of the ornaments used in the bamboo and rattan and so on with hand-woven way to make a finished product.

The most obvious change in the traditional dress of the Dulong is the introduction and application of textile technology as a demarcation. Before the introduction of textile technology to the Dulong, they used primitive materials and maintaining a relatively primitive way of dressing, which was mainly based on leaves, animal skins, and hand-knitting, and the Dulong people in the early primitive society are mainly concerned with the functional requirements of the dresses in terms of

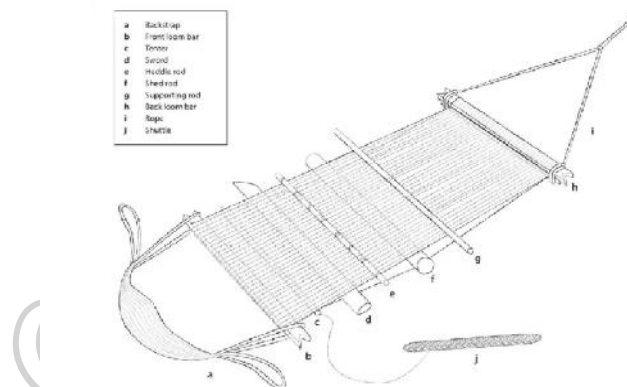
covering up their shyness and avoiding the cold, and then the Dulong mastered the method of hand-knitting. Subsequently, the Dulong people mastered the hand-woven method, but there was no great change to the Dulong clothing; the Dulong living environment is remote, the transportation is closed, and the contact with the outside world is extremely small, slowly the textile technology was introduced to the Dulong people, and at this time, the Dulong traditional clothing in terms of production materials and production methods have been greatly changed and improved. After the introduction of textile technology to the Dulong, the Dulong people, because of the geographical factors of their lives, usually used local materials, evolving from the most primitive leaves and animal skins to the use of raw materials from the wild plants around their living environment and settlements (Wang, 2001), such as nettles, flax, ramie, and so on, and they are good at twisting the hemp threads from the hemp that grows wildly or is planted in the vicinity of their living environment and then weaving them into a rectangular piece of cloth, which is called a “rectangular cloth. The Dulong specializes in twisting and weaving the hemp threads into a rectangular piece of cloth, and the “Dulong carpet” has been made in this way.

The process is the Dulong men will go to the mountains to cut the wild hemp, the hemp tree bark cut away from the retrieval, after washing and placing it to dry for one to two months, and then soaking, peeling, peeling stems, and then drying, and then finally do some processing, mainly to remove the pimples on the surface of the skin, and then twisted into a line with the hands after winding into a ball of thread, and then made into a ball of thread wrapped around a wooden frame locally known as the “wenka”. Then the threads are wrapped around a wooden frame in the shape of a Chinese character, namely “工”, called “wenka” by the local people, pulled tightly, and then dried in the sun, after which the threads are wound into bundles, and the bundles are put into an iron pot to be boiled and softened, and then some alkaline grass and firewood ashes, such as stove ash, are added, and stirred with a wooden stick until the color of the threads becomes white (Wang, 2017). In other words, the wild hemp is peeled, cut into filaments, soaked, boiled using stove ash water, washed, and dried in a multi-step process, and the treated wild hemp is twisted into hemp thread that can be woven. In terms of weaving methods, Dulong women are usually skilled in using looms to weave cloth, generally using the simplest handmade loin loom (see Figure 51), and the length of the hemp blankets woven on the loin loom is usually about 20 centimeters long, (Journey Department, 2014). Finally, several pieces are joined together to make a Dulong blanket.

The earliest Dulong carpets did not have the step of dyeing, and at this time, the color of Dulong carpets was relatively single, and the color presented by Dulong carpets was the original color of the hemp thread. As the Dulong women became more and more sophisticated in the treatment of fireweed and hemp, the hemp cloth, which was rough at the beginning, began to become more and more delicate, coupled

with the fact that the Dulong people have their own understanding of “beauty”, the Dulong people usually adopt the plants around their living environment in the color of their costumes and boil the juice of the plants at high temperature, and then dye the treated hemp threads with the juice of the boiled plants. The juice of the plant is then used to dye the treated twine, and this white rectangular piece of linen cloth has a rich and colorful color, mainly in five colors: red, yellow, green, blue, and black. Local people call it the “Dulong blanket,” which is called “Yueduo” in the Dulong language, and its width is about one meter and length is two meters. The raw materials and dyes used to make Dulong carpets are natural plants made from a combination of plant colors and plant fibers without any artificial chemical additives, so the materials used can be judged by various means, such as feeling and smell.

**Figure 51** *Manual Waist Machine*



*Note.* Figure from (Journey Department, 2014)

After the founding of New China, the Dulong people received many foreign cultural impacts, mainly the invasion of “Han culture”, and gradually had more choices in selecting materials for making Dulong carpets. On the one hand, the production materials of Dulong carpets retained the original habit of using hemp thread; on the other hand, cotton thread and wool textile were also introduced, and the original materials and single-color fireweed and hemp were developed into colorful hemp thread, cotton thread, wool thread, and even silk used in today’s society, so these materials were mixed together to produce Dulong carpets, and threads with different textures were mixed together to weave into Dulong carpets, which made the texture of Dulong carpets even softer, and the texture of Dulong carpets even more flexible. The texture of Dulong carpets is softer, and the colors of Dulong carpets become richer, no longer a single gray and blue, white, black and red, but now most of them are red, yellow, green, black, white, blue and purple, which is also known as “seven-color carpet”. Generally speaking, the modern Dulong carpet presents a diversified state of color species on the material.

### 4.3 DULONG BLANKET COLOR

The most important feature of Dulong carpets is the colorful vertical stripes. It is rare to see two vertical stripes arranged in the same way. The width of the interval between each vertical stripe may differ, and the color may also differ. The colorful vertical stripes of Dulong carpets are woven by arranging warp threads of different colors, and the weft threads are mostly white, rarely seen in blue or other colors (Zhang, 2020).

Most of the raw materials for coloring Dulong traditional costumes come from the roots and skins of wild or cultivated plants, leaves, grasses, and flowers. The local people peel off the bark of the tree called “Semubulang” and pound it into pieces, then put it into a pot and add water to boil it, to get the traditional Dulong “Dankuoyue”, which is the red color dye nowadays the roots of the walnut tree are split down, and pounded into pieces, then added water to boil it, to get the traditional Dulong black color dye; the roots of the walnut tree are split down, and pounded into pieces, then added water to boil it. The roots of the walnut tree are split down, pounded into pieces, and boiled with water to obtain the traditional black dye of the Dulong; the bark of the peach tree is used to be pounded and boiled to make what the locals call “Bingaduo,” which is now called blue dye; a kind of local name “wen-sin” grows on the rocks around the environment of the Dulong tribe; and a sort of local name “wen-sin” grows on the rocks around the Dulong tribe’s settlement. “Wenxin,” which grows on the rocks around the Dulong settlements, produces red and blue flowers in March and April every year, which can be picked, crushed, and mashed separately to obtain the Dulong’s traditional red and blue dyes. The leaves of another kind of grass, called “Xinnanabu” by the local people, are picked and boiled in a pot of water to obtain the traditional green dye of the Dulong people.

**Table 2** *Statistics on Dyeing Materials for Dulong Traditional Costumes*

<b>Plants</b>	<b>Semubulang (Bark)</b>	<b>Walnut tree roots</b>	<b>Peachtree (bark)</b>	<b>Wenxin (flowers)</b>	<b>Wenxin (flowers)</b>	<b>Xinnanabu (leaves)</b>
Color	Dankuoyue (Red)	Black	Bingaduo (Blue)	Blue	Red	Green



**Table 3** *Color Analysis of Dulong Clothing*

Three sorts of the color classifications of Dulong blankets	Sample graphs
<p>The first one is red, orange, yellow, green, blue, and purple, which is the most common and basic way of color matching for modern Dulong blankets; the width of each color stripe is relatively the same, and the width of each color distribution arrangement is also similar, the transition space of the middle color can be interwoven with some other colors of the vertical stripes, the width of these transitional lines is relatively thin, the width of which is generally about one-fifth of the width of the main vertical stripes.</p>	
<p>Secondly, the color matching is mainly in grey, and this kind of color matching is mainly in grey-blue, grey-green, and other cold grey tones of vertical stripes, with white vertical stripes occupying a larger space, and the width of the white stripes is much wider than that of the rest of the colors in the middle of which you can see interspersed yellow, green, red and other saturated, narrower vertical stripes.</p>	
<p>Thirdly, with a certain color as the main color, with some other colors of vertical stripes, this kind of matching line color is mainly warm colors (e.g., yellow, orange, red, etc.) as the main color, with some blue, green, and other narrow stripes, usually the Dulong people can skillfully apply the complementary colors to match.</p>	

Summary: Among the three types of color matching, the vertical stripes of the first type of color matching are the most representative, and no very clear preference for gender characteristics, age, group, etc. is shown in these three-color matching. Over time, due to the incorporation of industrially produced colored cotton threads and woolen threads, the colors have become richer and more vibrant than before, gradually presenting the state seen today.

**Table 4** *Summary of Variations in Materials, Colors, and Weaving Methods of Dulong Blankets*

	<b>Clothing Color</b>	<b>Textile Method</b>	<b>Material</b>
Traditional	Yellow, Green, Black, Blue,	Hand-woven, Hand-waisted, Machine Weaving	Leaves, Animal Skins, Twine, Fireweed
Modern	Orange, Yellow, Green, Cyan, Blue, Purple, Gray, Black, White	Industrial Textile, Machine weaving	Cotton Thread, Wool, Silk

#### 4.4 STRUCTURE AND WEARING TABLES OF DULONG TRADITIONAL CLOTHING

##### 4.4.1 STRUCTURE OF DULONG CLOTHING

The traditional costumes of the Dulong people are mainly made of Dulong blankets (see Figure 52), and the overall structure is in the Table of a piece (see Figure 53). The most obvious changes in the structural characteristics of the costumes of the Dulong people are before and after the founding of New China. The most obvious changes in the structural characteristics of the Dulong's costumes were before and after the founding of New China. Before the founding of New China, the Dulong costumes did not change much either in shape or style and kept the primitive way of dressing, which was mainly to cover up shyness and keep out the cold, and the human body was the main focus of the process of wearing them, usually wrapping, wrapping, and draping a piece of linen or two pieces of linen over the human body and finally tying it in a knot. In the process of wearing, the human body is the main focus, usually using one or two pieces of linen to wrap, twist, drape, and so on the human body, and finally to tie a knot to fix the clothing, which is the traditional clothing of the Dulong. Dulong men, generally with a small square piece of linen cloth to cover the lower body waist, tie a hemp rope to fix the linen wrapped around the body. The Dulong women are mostly in the body hanging two pieces of linen, in the left and right shoulders diagonally hanging, wrapped around each other, on the Dulong carpet

wearing methods, wearing methods and specific combinations vary from one person to another. The method of wearing and specific matching depends on different occasions, such as labor production, folk activities, festivals, and daily life dress styles are different. From this point of view, the traditional dress of the Dulong people is characterized by the feature of “one dress for many times”. After the founding of New China, the Dulong clothing has been increasingly “Sinicized” and even consistent with the Han Chinese; until today, only some of the Dulong elderly still wear a Dulong blanket on the outermost layer of their clothing.

**Figure 52** *Dulong Traditional Dress*

**Figure 53** *Dulong Traditional Dress Style*



*Note.* Figure by the author

#### 4.4.2 ORIGINS OF “ONE-PIECE” CLOTHING

In the development of Chinese and Western clothing since ancient times, the “one-piece” structure of clothing is not unique to the Dulong ethnic group, but the Dulong clothing is lagging behind in the development of the “one-piece” structure, resulting in the gradual fading of Dulong traditional clothing out of people’s view, and Dulong people are taking Han clothing as their daily clothing, and there are almost no young people wearing Dulong traditional clothing. The Dulong people wear Han Chinese clothing as their everyday clothing, and almost no young people wear Dulong traditional clothing.

The explanation of “one piece” in the Dictionary is that it means quantity, one sheet or one piece, something flat and thin (Shu, 1999). In ancient times, when the material was scarce, the materials used were mainly furs woven fabrics, etc. Due to the limitation of the tools at that time, the clothing also went through the stage from

uncut to cut. The table of the “one-piece” garment structure evolved with the development of human society and occupied an important position in the history of clothing development in the East and the West.

#### 4.4.3 THE DEVELOPMENT OF “ONE-PIECE” CLOTHING OVER TIME

Different periods have given different cultural connotations to the “one-piece” garment structure, and how to better inherit and develop it has become a problem for many designers to consider. A “one-piece” clothing structure can achieve minimal or even zero waste through reasonable design, such as Issey Miyake’s A-POC series, which does not waste a single inch of fabric. The many explorations of the “one-piece” structure also provide a reference for the development of clothing structure and clothing aesthetics.

“One-piece” draping and wrapping: Egyptian and ancient Greek garments were mostly made of a single piece of fabric, uncut (see Figure 54), with the shoulder and waist circumference of the human body as the pivot point for draping, wrapping, and draping (see Figure 55), thus shaping beautiful folds (see Figure 56, 57), the most representative of which are the Chiton (see Figure 58) The most representative are Chiton (see Figure 59) and Himation (see Figure 60).

**Figure 54** *Egyptian, Ancient Greek Period Women Wearing Clothing*

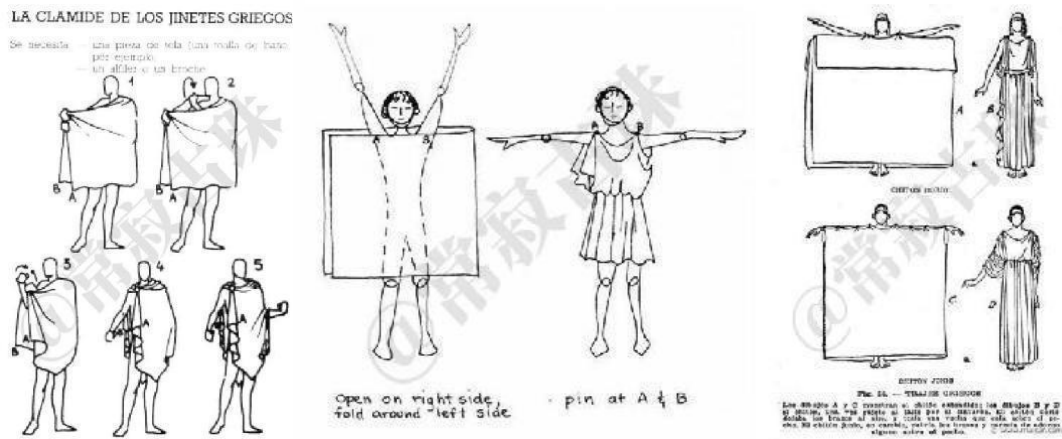


Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

**Figure 55** Steps for Wearing a “One-piece” Garment

**Figure 56** Example of Wearing “One-piece” Garment

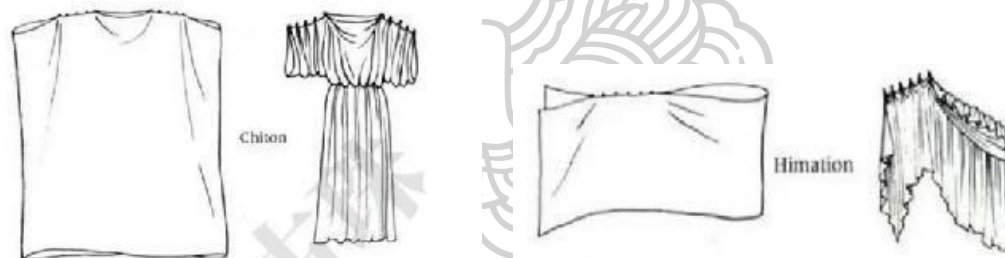
**Figure 57** Example of Wearing “One-piece” Garment



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

**Figure 58** Wearing forms of Chiton

**Figure 59** Wearing forms of Himation



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

#### 4.4.3.1 “ONE-PIECE” PIERCING CUT

In 1977, American designer Roy Halston developed a “one-piece” dress (see Figure 60) based on the pullover “Crisscross” and “one-piece” patterns, using clever diagonal splits to create a “one-piece” dress. “one-piece” dress based on the “cross” and “one-piece” patterns.

**Figure 60** “One-piece” Diagonally Cut Champagne-colored Maxi Skirt

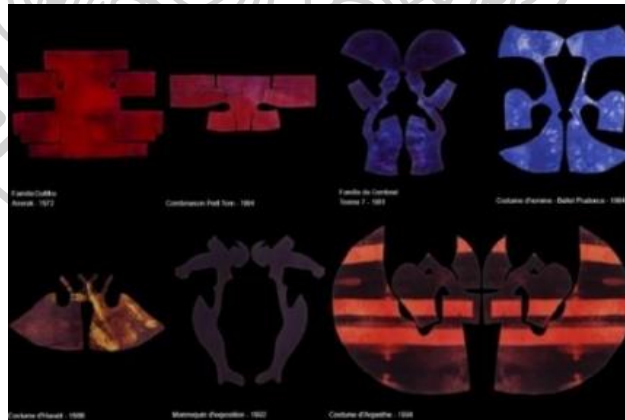


Note. Figure from the Internet

#### 4.4.3.2 “ONE-PIECE” DYNAMIC TAILORING

Geneviève Sevin-Doering applies her concept of “one-piece” tailoring to all clothing-related areas, from street wearing to stage wearing and even functional and professional clothing (see Figure 61).

**Figure 61** Some of Geneviève Sevin-Doering’s “One-piece” Works

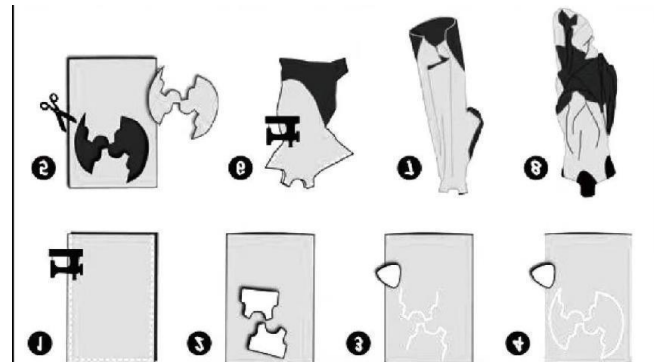


Note. Figure from the Internet

Fashion designer Julian Roberts, a graduate of the Royal College of Art, is the namesake and promoter of “subtractive tailoring” and has more than a decade of experience in menswear design. “Subtractive tailoring, both literally and practically, differs from traditional three-dimensional tailoring (see Figure 62). It is a creative cutting technique based on a cross between flat cutting and traditional three-dimensional cutting, which Julian Roberts explains on the front page of his website as “a hollow construction for different types of men’s and women’s fashions,

accessories, and interior and exterior product design.” He has already promoted the technique in 25 countries, including the United Kingdom, Canada, France, and the United States. It is clear that words alone are not enough, but hands-on experience is needed to understand the unique features of “subtractive cutting”.

**Figure 62** “One-piece” Subtractive Tailoring Steps of Julian Roberts



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

#### 4.4.4 EXPRESSIONS OF DULONG TRADITIONAL DRESS

Dulong traditional costumes are mainly of “one-piece” structure, and the development stage has been in the primitive period of backwardness, that is, the “one-piece” hanging and wrapping period described in the previous section, and the expression of Dulong traditional costumes are presented in the Table of wearing the “Dulong blanket”. The expression of Dulong traditional clothing is presented in the Table of wearing the “Dulong carpet”, which is specifically divided into the following three ways of expression

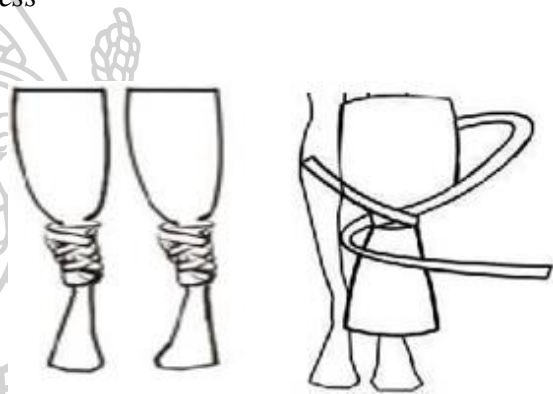
##### 4.4.4.1 WINDING

In the wearing of Dulong costumes, the winding style is the most common in both men’s and women’s wearing, and the winding style of wearing is manifested in Dulong men’s wearing as tying their legs; Dulong men usually wear lab coats and pants (see Figure 63), and the majority of Dulong men will tie their legs (Zhao, 2000), winding burlap around the pants they wear and wrapping them around the lower part of the calf with burlap (see Figure 64); before the establishment of New China, some Dulong men usually used a piece of burlap to cover their lower body, and then simply wrap them with a twist around the waist (see Figure 65,66). lower part of the calf; before the founding of New China, some Dulong men usually used a piece of linen cloth to cover their lower body, simply wrapped around their body, and then tied a linen rope around their waist as a way of fixing the linen cloth worn on their body;

women use Dulong blankets to be wrapped around their chests in one or two loops, and then fixed on their right shoulders (see Figure 65), and it is worth noting that the twisted style on the human body. It is worth noting that the twisting style on the human body is manifested by the fact that the fabric passes through the same body part twice or more, and the pieces of clothing naturally hang down without decoration at the waist (see Figure 66); children who have not yet reached adulthood in the Dulong tribe are almost all naked, and some of them either wrap a piece of cloth around the lower half of their body to cover their shame, or tie on a small wooden board or a small bamboo board of about three-fingers' width or something similar to it, and their function is mainly to cover their shame.

**Figure 63** *Dulong Men's Traditional Dress*

**Figure 64** *Dulong Men's Gaiters*



*Note.* Figure by the author

**Figure 65** *Dulong Women's Dress "Winding Style"*

**Figure 66** *Dulong Women's Dress Styles*



*Note.* Figure by the author



#### 4.4.4.2 LAYERED

In the traditional dress of the Dulong, the stacked dress attire is generally reflected in the Dulong women's dress attire; most of the Dulong women are draped with two pieces of linen cloth (Mo, 1994), which are diagonally draped over the left and right shoulders, wrapped and twisted around each other (see Figure 67), and tied tightly with twine or other bands and ropes at the waist position (see Figure 68), and some of them will diagonally drape a Dulong blanket over the right shoulder, followed by wrapping another piece of linen cloth around the right shoulder from the right side to the left side, and finally pulling it to the chest and fixing it firmly with bamboo needles. Some women will drape a Dulong blanket diagonally over their right shoulder, then wrap another piece of hemp cloth around their right shoulder, wrapping it from the right side to the left, and finally pull it up to their chests and fasten it with bamboo needles. In addition, some Dulong women wear bamboo tubes or earrings in their ears, chest chains, and rattan bracelets on their hands. Modern dress of Dulong girls. They wear modern dresses inside and Dulong blankets outside.

**Figure 67** *Dulong Women's Clothing "Overlapping Style"*

**Figure 68** *Dulong Women's Clothing Styles*



*Note.* Figure by the author

#### 4.4.4.3 DRAPED

Among the costumes of the Dulong, the hanging style (see Figure 69) is the most common and basic way of wearing the Dulong blanket. One or more pieces of the Dulong blanket are simply draped diagonally over the left or right shoulder and pulled through the armpit of the other side (see Figure 70), and the blanket is simply tied with a knot in front of the chest or over the shoulder to secure the blanket on the body. The simplest Table of draping is best seen in Dulong men's clothing, where some Dulong men either drape a long piece of linen cloth diagonally across their backs, pulling one corner over the left shoulder and another under the right armpit before tying the two corners to their chests. It is customary for Dulong men to wear Dulong blankets with the knot fixed on the left side. It is worth noting that the hanging style manifests as draping and hanging on the human body, and the difference with the winding style is that the fabric will not be repeated in the same body part.

**Figure 69** *Dulong Women's Dress "Hanging Style"*

**Figure 70** *Dulong Women's Dress Styles*



*Note.* Figure by the author


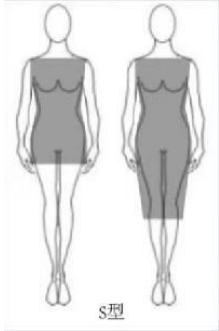

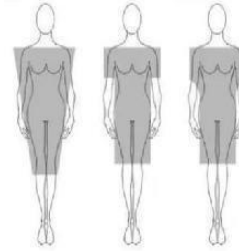
## 4.5 ANALYSIS OF DULONG TRADITIONAL DRESS SILHOUETTE


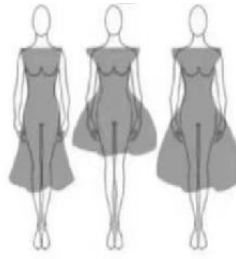

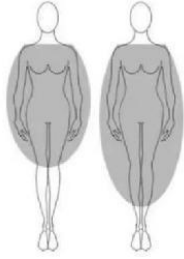

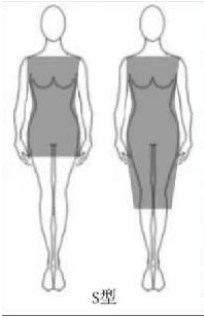
### 4.5.1 TYPES OF CLOTHING SILHOUETTE

The silhouette of a garment refers to the outer contour and shape line of the garment, and the existence of the silhouette indicates that there is an indispensable relationship between the garment and the human body, which contains two parts: one is the quantitative relationship between the external garment's length, width, height, and volume; and the second is the proportionality relationship between the external garment and the internal human body Table, which is a qualitative relationship.

Clothing silhouette is the first element of clothing style modeling. They can be summarized in geometric shapes as square, triangle, round, etc. According to the classification of physical representation, it can be divided into egg shape, bud shape, hourglass shape, bell shape, tulip shape, beauty fishtail shape trumpet shape, etc. We usually use the classification method of the famous French designer Christine Dior, who created the alphabet classification method, which is a kind of English letter Table to express the characteristics of the clothing modeling method in accordance with the classification method. The silhouette can be generally categorized into six types: A-type, H-type, T-type, S-type, X-type, and O-type.



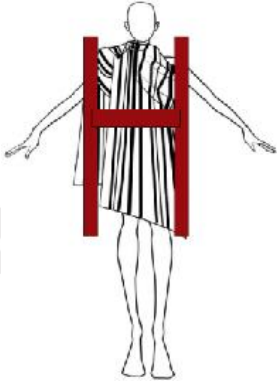

**Table 5** Summary of Silhouette Classification

Types	Characteristics	Sample graphs	Shapes
H-shaped	Rectangular in shape, the width difference between the shoulders, waist, and hips is weakened. This type of garment relaxes the waistline, thus disguising the bulkiness of the waist. The external silhouette resembles a capital H.		
T-shaped	Inverted trapezoidal or inverted triangular shape, wide at the top and narrow at the bottom. By enlarging the shoulder line and tightening the proportion of the lower body, the overall design This style focuses on the upper half of the body. It reduces the air from the top to the bottom, Tableting a T-shape silhouette.		

X-shaped	<p>By exaggerating the shoulders, the hemline of pants and skirts, and tightening the waist, the overall appearance of the upper and lower parts of the loose and exaggerated, narrow in the middle, similar to the letter X; it coincides with the beautiful curves of women.</p>		
O-shaped	<p>The shape is an oval with a tight upper and lower mouth line and exaggerated shoulders, and the overall shape is fuller, presenting a “O” view of the garden.</p>		
S-shaped	<p>Chest and hip circumference is moderate and waist circumference is tightened. It is through the structural design, fabric characteristics and other means to achieve the embodiment of women’s “s” beautiful curves.</p>		

## 4.5.2 ANALYSIS OF DULONG TRADITIONAL CLOTHING SILHOUETTE

**Table 6** *Dulong Traditional Clothing Silhouette Analysis*

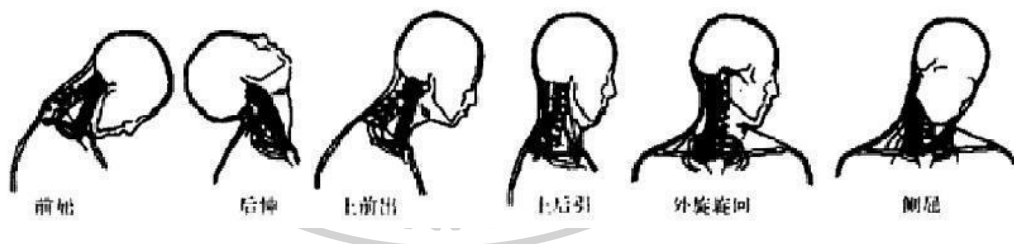
Sample graphs	Characteristics	Shapes
	<p>Dulong draped clothing: the outer contour of this type of clothing is rectangular, with pieces of clothing falling naturally from the shoulders and armpits, and there is no clothing structure at the waist, so the silhouette of this type of clothing is “H” shaped.</p>	
	<p>Dulong Twisted Clothing: The outlines of this type of clothing are rectangular, and the pieces of clothing are fixed at the shoulders after being twisted in front of the chest, and the pieces of clothing naturally fall from the shoulders and armpits, and there is no clothing structure modification at the waist, so the silhouettes of this type of clothing are “H” shaped.</p>	
	<p>The Dulong’s stacked clothing: This type of clothing is loose and exaggerated at the top and bottom, narrow in the middle, and prominent at the waist, so the silhouette of this type of clothing is “X” shaped.</p>	

## 4.6 ERGONOMICS REQUIREMENTS FOR THE IMPROVEMENT OF DULONG TRADITIONAL CLOTHING STYLES

### 4.6.1 FACTOR ANALYSIS OF CLOTHING STRUCTURE UNDER ERGONOMICS

Neck: The neck is the key part of the body that connects the head to the trunk and extends from the submandibular point of the head to the cervical fossa above the clavicle and is bounded by the seventh cervical vertebra (see Figure 71). The neck not only supports and moves our head but also has a rounded, determines the amount of relaxation of the collar according to the different styles of clothing in order to ensure a comfortable shape that is thicker below and thinner above. As one of the most frequently moving parts of the human torso, maintaining a basic amount of relaxation of 2-3 centimeters is considered optimal. In the design of collar shape, it is necessary to give full consideration to the coordinated relationship between the collar and the head and shoulder, and at the same time determine the amount of relaxation of the collar according to the different styles of clothing, in order to ensure comfortable wearing and maintain the overall aesthetic. In addition, the natural curve and range of motion of the neck should also be considered to provide a more humanized and ergonomic solution for the design.

Figure 71 *Dynamic Analysis of the Human Neck*

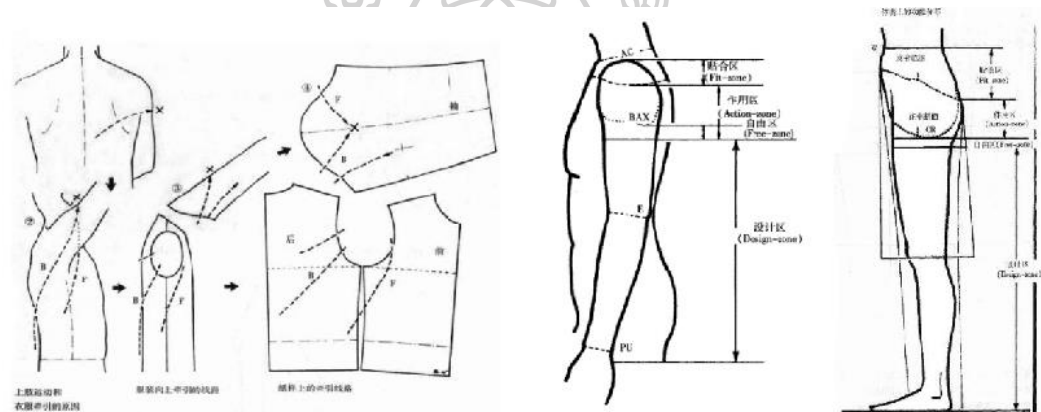


Note. Figure from the Internet

Shoulder: the shoulder is supported by the clavicle and the scapula, and its range extends from the lower limit of the horizontal position of the intersection point of the humerus that protrudes from the front of the human body, the scapular spine of the back and the edge of the vertebrae to the area of the collar line. Shoulder carries our clothing. Excellent shoulder design can enhance people's aura. The up-and-down and back-and-forth movement of the shoulder crest affects the appearance and comfort of the garment. To ensure that movement is not restricted by the garment and to minimize traction on the shoulders, the structural design should leave some clearance at the shoulder end. When the shoulder width decreases or the shoulder peak increases, this results in an increased range of motion of the upper extremity.

**Back and Upper Extremities:** In daily life or at work, people often execute various movements, such as natural swinging of the hands, placing the hands on the chest, lifting up, etc., which result in expansion and skin displacement of the back. As shown in Figure 3.2, the back presents a linear pattern of outward expansion. The deformation of the skin during different movements can be measured by the body press method, plaster banding method, and body tracing, but the heel of the arm of the upper limb will still be partially affixed during this process (see Figure 72). Different types of sleeves can be designed according to the Table of movement, such as inset sleeves, fitted sleeves, and bubble sleeves, etc., in order to adapt to different movement needs.

**Figure 72** Human Back, Upper Limb, and Lower Limb Dynamics in Relation to Garment Construction



Note. Figure from the Internet

**Hips and Lower Limbs:** The hips and lower limbs play an important role in the structure of the human body. As the area connecting the waist and legs, the buttocks are given their fullness by the gluteus maximus muscle, and these curves play an obvious role in supporting the style of the garment. The lower limbs, on the other hand, are part of the legs and show different movement postures through the extension and flexion of the hip and knee joints. The rate of skin deformation is greatest at the upper knee and at the midpoint of the knee, along the inner thigh slanting downward and horizontally, respectively. It should be noted that the stretching line of the lower body basically does not pass 10 centimeters below the knee, so the deformation rate in this area is smaller. When designing pants, paying attention to skin deformation at the inner thigh and knee is especially important to ensure comfortable wear (see Figure 72). In addition, when designing skirts, it is also possible to shape in the free and design zones to create garment styles that are compatible with the structure of the human body and the demands of movement.

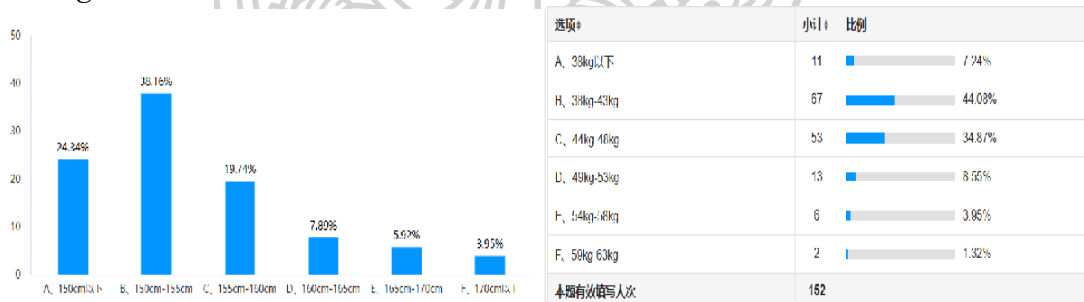
## 4.6.2 STRUCTURAL FACTOR ANALYSIS OF DULONG TRADITIONAL CLOTHING UNDER ERGONOMICS

### 4.6.2.1 ANALYSIS OF DULONG WOMEN'S BODY SIZE AND THE HIGH NUMBER OF POSTURES MAINTAINED ON A DAILY BASIS

After the questionnaire survey of Dulong women's clothing preferences, the results show that Dulong women are thin; the total number of women who filled out the questionnaire survey is 152, the age of 23-28 years old, accounting for 41.45% of the total number of women, women over 28 years old accounted for 28.95%, women between the ages of 18-23 years old accounted for 20.39% of the total number of women, their Most of them are between 150cm and 155cm in height, accounting for 38.16%, and 24.34% are less than 150cm, and most of them are between 38kg and 43kg in weight, accounting for 44.08%, and 34.87% are between 44kg and 48kg, as shown in Figure 73/74.

**Figure 73** Data on the Structure of the Questionnaire on the Average Height of Dulong Women

**Figure 74** Data on the Structure of the Questionnaire on the Average Weight of Dulong Women

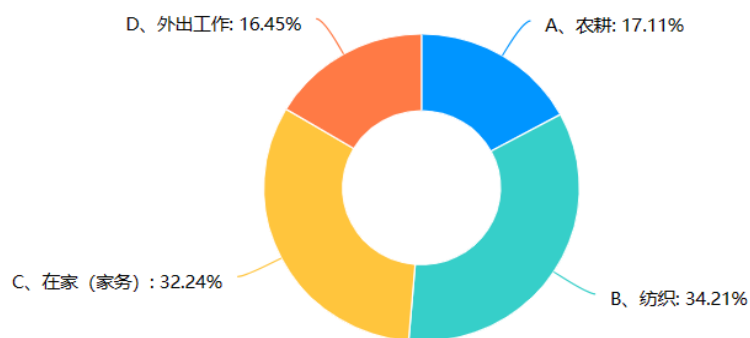


After analyzing the content and results of the questionnaire survey, it is known that most of the Dulong women are engaged in occupations mainly in textile, accounting for 34.21% of the data, and women at home (housework) rank second, accounting for 32.24% of the data; the postures that Dulong women keep more in their daily lives are sitting with knees bent 30.26%, standing 23.68%, and walking around 19.47%, and it is noteworthy that young women in modern society maintain the most postures of sitting, standing and walking around.

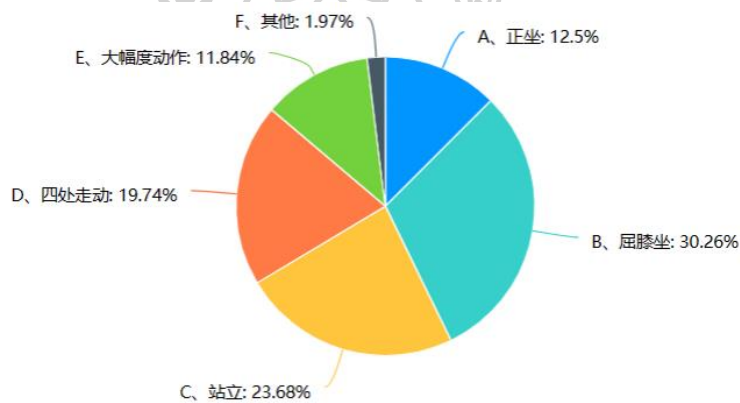
Occupational data of Dulong women (see Figure 75) and analysis of data on maintaining more postures on a daily basis (see Figure 76).



**Figure 75** Dulong Women's Occupation Questionnaire Data

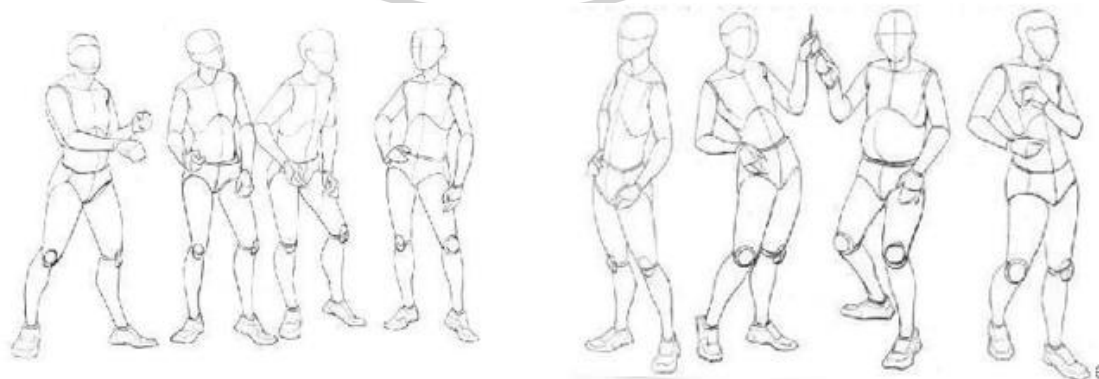


**Figure 76** Questionnaire data on Dulong Women's Maintaining more Postures on a Daily Basis



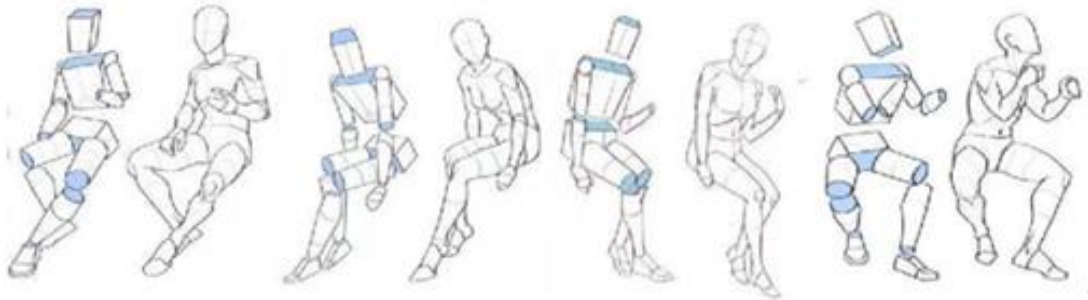
The most common standing postures as well as sitting postures were analyzed dynamically:

**Figure 77** Daily Standing Human Dynamic Analysis



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

**Figure 78** Daily Sitting Human Dynamics Analysis



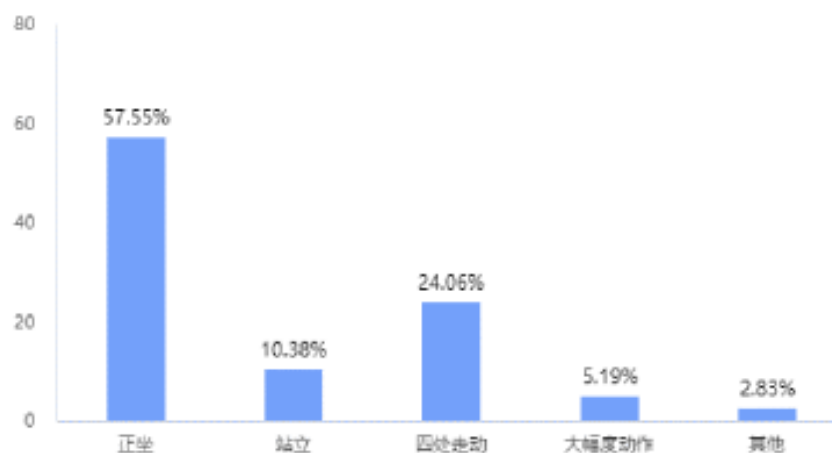
Note. Figure from the Internet

<https://www.xiaohongshu.com/>

Standing posture dynamic body torso is upright, the overall body parts of the movement amplitude are not large, there is no obvious angle (Figure 77), in the clothing structure and layout, do not need to set too much activity. In sitting posture, the torso is folded, with the crotch as the dividing line of the body, the upper and lower body is a clear angle, and the thighs and calves at an angle of  $30^{\circ}$ - $160^{\circ}$  (Figure 78), which is shown in the garment structure and pattern making, and the amount of activity needs to be set in the waistline and waist-hip height data.

Analyzing the data on the postures that young women in modern society maintain more in their daily lives (Figure 79), the number of people who are sitting is the highest (Figure 80, 81), with 57.55% of the data, followed by walking around, with 24.06% of the data, and the number of people who are standing is lower, with 10.38% of the data.

**Figure 79** Questionnaire Data on Young Women Maintaining More Postures in Modern Society



**Figure 80** *Human Dynamic Analysis of the Human Body in Sitting Posture*



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

**Figure 81** *Human Dynamic Analysis of the Human Body in Sitting Posture*



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

#### 4.6.2.2 DYNAMIC ANALYSIS OF DULONG WOMEN SITTING ON BENT KNEES IN THE HUMAN BODY

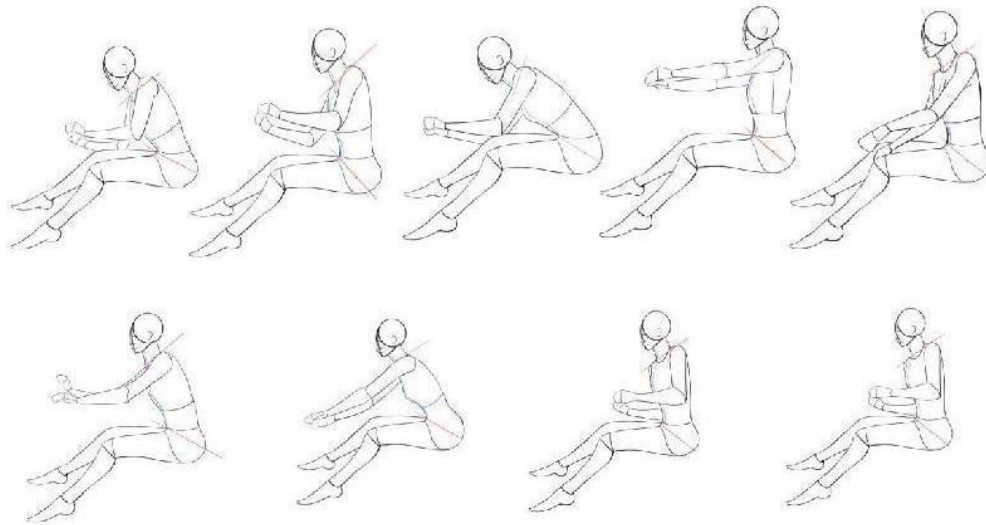
**Figure 82** *Sitting Position of Dulong Women when Weaving*



Note. Figure from the Internet  
<https://www.xiaohongshu.com/>

The Dulong traditional clothing structure has been improved, and the clothing needs to achieve the functions required for daily life; for example, the limbs are able to move freely and walk around. It is worth noting that the Dulong women, because of their weaving work, keep the posture of sitting on their knees for a long period of time (see Figure 89), and when the Dulong women are sitting on their knees, the relationship between their backs, shoulders, and chests with the structure of the clothing is that the backs usually Table an angle with the hips and thighs. The back usually Tables an angle with the straight line of the hips and thighs, and in the weaving action, when the body leans forward, the angle is about  $60^{\circ}$ , and when the body leans back, the angle is about  $110^{\circ}$  (see Figure 90). When the body leans forward and back, with the action of the upper limbs and the neck, this requires that the sleeve cages in the garments have a larger curvature than the ordinary fitted garments, and that the openings of the collars be bigger than those of ordinary fitted garments, and that the structure of the garments can make the collar depths and the necks larger than the ordinary fitted garments, and that the neck depths can be made larger than those of ordinary fitted garments. In the structure of the garment, the collar depth and the collar curvature can be enlarged, and the position of the back activity needs to add some activity, and can also increase the activity in the position of the front chest.

**Figure 83** *Human Dynamics Analysis of Dulong Women's Weaving Sitting Position*



*Note.* Figure by the author

When sitting on bended knees, the hips and lower limbs need more activity than when sitting in a straight position, and when weaving, the hips, and lower limbs cooperate with the waist and back to do forward and backward movements, and in order to successfully complete the movement, the design of the corresponding parts of the clothing also needs to be considered, for example, dresses: increase the structure of the hips and the legs to set up the extra amount of activity, to ensure that when sitting on bended knees, the thighs and the calves can move freely, and when weaving, the waist and hips will not be pulled between the clothes because of insufficient activity, so that the body receives restrictions when working. When weaving, the waist and hips will not be stretched because of the lack of movement of the garment, thus restricting the body while working.

#### **4.7 EXPERIMENTS ON THE IMPROVED DESIGN OF DULONG TRADITIONAL CLOTHING IN STAND-UP CUTTING**

##### **4.7.1 YOUNG WOMEN'S CLOTHING FAVORITE BIAS**

According to the needs of this research, improving Dulong traditional clothing adapted to the aesthetics of modern women requires collecting questionnaire data for young women, mainly to obtain data on their preferences for clothing styles, silhouettes, and colors in current society.

Young women's favorite clothing combination is the dress, with 50% of the selection data, followed by the half skirt added top table of dress, with 30.57% of the selection data (see Figure 84).

**Figure 84** Results of the Questionnaire Survey on Young Women's Preferences in Clothing Matching

5、您最常穿着的服装款式搭配是: [单选题]

选项	小计	比例
A、半身裙+上衣	107	30.57%
B、裤装+上衣	68	19.43%
C、连衣裙	175	50%
D、其他(请注明) [详细]	0	0%
本题有效填写人次	350	

Young women's favorite clothing silhouettes are, in order, O-silhouette, A-silhouette, S-silhouette, H-silhouette, T-silhouette, X-silhouette (see Figure 85).

**Figure 85** Results of the Questionnaire on Young Women's Clothing Silhouette Preferences

6、您最喜欢穿着的服装廓形是: [单选题]

选项	小计	比例
A、A	84	24%
B、O	109	31.14%
C、H	41	11.71%
D、S	67	19.14%
E、T	31	8.86%
F、X	18	5.14%
本题有效填写人次	350	

(3) Young women's favorite clothing design elements are pleats, twists, repetitions, divisions, and folds (see Figure 86).

**Figure 86** Data on the Results of the Questionnaire Survey on Young Women's Preferences for Clothing Design Elements

7、您喜欢服装上有哪些现代设计元素? [多选题]



选项	小计	比例
A、褶皱	335	95.71%
B、翻折	87	24.86%
C、扭转	296	84.57%
D、重复	259	74%
E、分割	241	68.86%
其他(请注明) [详细]	0	0%
本题有效填写人次	350	

#### 4.7.2 MODERN CLOTHING DESIGN EXPRESSION METHODS

In terms of structural modeling, modern clothing design provides many methods. In this research, aiming to improve the backward clothing structural modeling of Dulong traditional clothing, it is necessary to organize and analyze modern clothing design expression methods applicable to the structural improvement of Dulong traditional clothing modeling, and this research requires consideration of the cultural symbols of Dulong traditional clothing, the daily needs of the Dulong women, and so on.

The following Table shows the presentation of several common methods of modern clothing design collected for this study:

**Table 7** Common Expression Methods of Modern Clothing Design

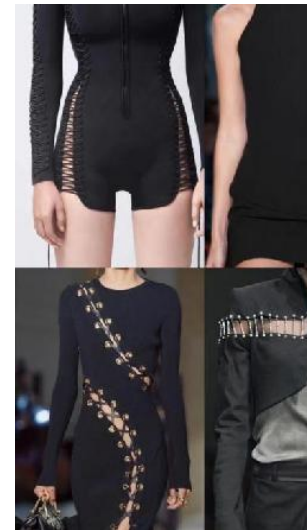
Methods	Features	Sample graphs
Repeated: The same or similar Tables appear repeatedly according to certain compositional laws. Will Table a group momentum, creating a special atmosphere of national effect.	Design points: ① The number of Tables is more than three or five; ② Table can be a three-dimensional shape, a pattern decoration, a knot, etc. The combination of the Table and the human body should be skillful, and the number and shape of the Table should be decided according to the overall effect of clothing.	
Fold over (e.g., one half of a page): Use the reverse folding of the front and back of the fabric to create the image of the garment. Folding part of the fabric to reveal the reverse side of the fabric adds layers to the image of the garment.	Design points: ① play the advantages of fabric performance, the pursuit of smooth and natural effect; ② folding to have a pivot point, to maintain relative stability; ③ folding to be appropriate, to do less than more, to win.	

Demerger: The use of line Table will be clothing body “cut” into a number of small Tables, full of style details, the use of area contrast to increase the visual feeling.

Extract and shrink: Using the elastic band’ s contraction, part of the fabric of the garment will be tightened and gathered to cause the visual image effect of the uneven appearance of the garment.

Adhere: Attachment method refers to the use of other materials, some of the functional components attached to the clothing structure, and fixed together with the garment, together with the complete garment modeling.

Design Points: ① division including horizontal line division, vertical line division, diagonal line division and curve division of the four Tables of expression; ② division of the line Table of wide and narrow; ③ division of the process means are different. Including the seizure of bright lines, clip the teeth strip, paste the strip, turn out the head of the seam, splicing fabrics and so on.



Design points: ① shrinkage of the part to adapt to the structure of the human body; ② shrinkage Table can be equidistant from parallel settings, but also flexible and free irregular use, but also diagonally left and right asymmetric placement; ③ shrinkage of the amount should be appropriate.



Design points: ① increased material is different from the clothing material; ② can be through the string, hanging, bundling and other techniques and clothing bundling





Turn around (an undesirable situation): The fabric undergoes a 360° twisting transition, which is generally decorative and not functional.

Camouflage:

Simulate the Tables of various things and extract their external shapes, internal structures, color combinations or charms to be presented in clothing.

Wrinkles: Pleats, is the dress in accordance with a certain pattern of folding produced by the grain marks. Wrinkle, is due to the clothing fabrics of tightening and kneading of the natural or random pattern.

Design Points: ① torsion transition around the torsion center to build three-dimensional modeling, with the characteristics of one-time forming; ② the more the number of torsions circles the fabric Table closer to the line, the fewer the number of circles of the torsion center focusing on the role of the stronger; ③ the more the torsion center of the focusing on the role of the weaker



Design key points: ① element extraction is usually based on architectural shapes, flora and fauna, mountains and rivers, topography; ② fabric stacking, blending, cutting, etc. for the three-dimensional shape of the garment.



Design points: ① with the changes in body movement and change, through the folds highlight and show the dynamic beauty of the human body and the beauty of the lines; ② used for thin and light fabrics, to increase the sense of movement for the clothing, used for heavier fabrics, it adds a sense of modeling.

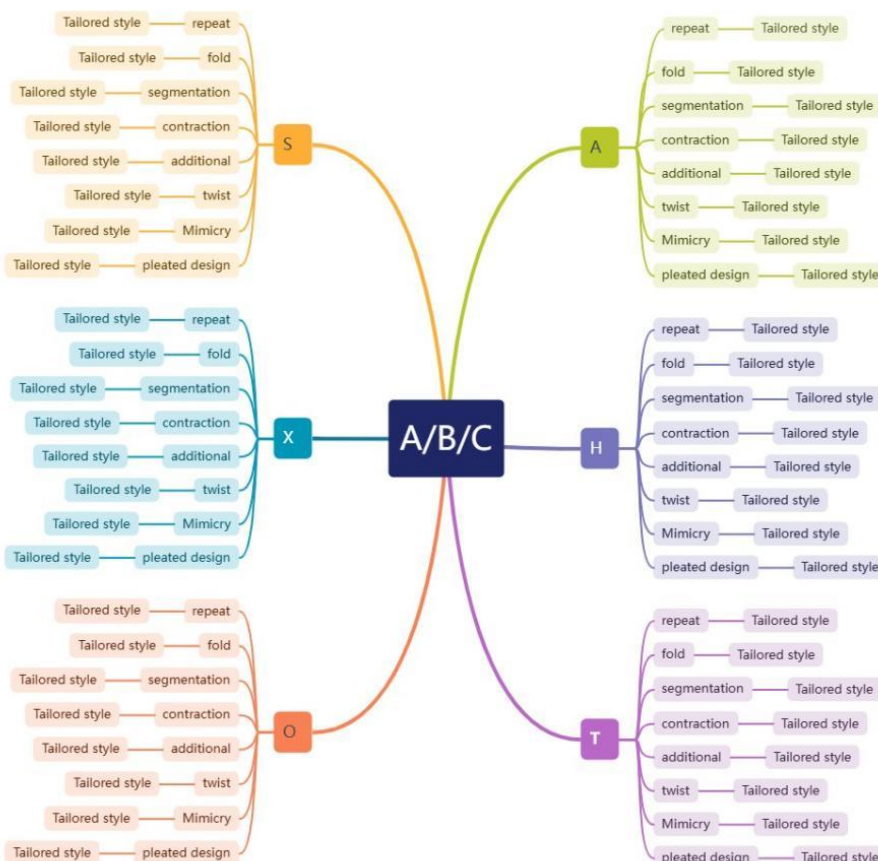


### 4.7.3 THINKING MAPS FOR TAILORING EXPERIMENTS

Two key factors in designing the “one-piece” garment structure are the support point and part of the human body and the position, size, and number of openings in the fabric (Wu, 2010). Continuing the “one-piece” structure and three wearing Tables of Dulong traditional clothing, adapting to modern aesthetics and meeting the needs

of Dulong women's daily life and work, we make innovative designs for the silhouettes and styles of Dulong traditional clothing.

**Figure 87** Thinking Map of the Stand-up Experiment










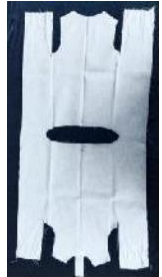







Note. Figure by the author





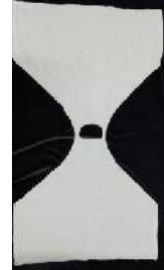






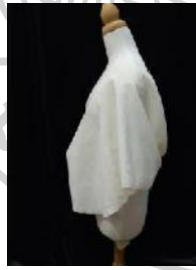



Firstly, three groups of experiments are set up according to three different Tables of Dulong traditional clothing wearing, Step 1: Group A: draping type, Group B: winding type, Group C: stacking type, three kinds of favorite silhouettes of young women and several different kinds of favorite modern clothing design elements of young women are set up under each group of experiments, Step 2: according to the questionnaire survey results, a certain type of silhouette is selected, Step 3: Immediately after that, three different modern clothing design methods are randomly selected in turn for cutting and modeling. Steps 1 to 3 above are considered as one experimental process, and each time, we can get the cutting results of three styles. Repeating this experimental process three times for each group can get nine styles of stand-up styling results, which is the stand-up styling experimental mind map in this research (see Figure 87).

#### 4.7.4 TAILORING EXPERIMENT










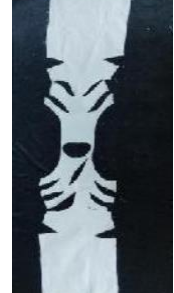





**Table 8** “A” Silhouette Tailoring of “one-piece” Draping Structure of Dulong Costume

Experiment Group A: “One-piece” Draping (A Profile)				
Folds (Style 1)				
				
Twist (Style 2)				
				
Folding (Style 3)				
				
Summary				
<p>Style 1: This style focuses on the waist-hip ratio and adds a pleated design method to the hem.</p> <p>Style 2: Focusing on the structural design of the chest and underarms, a twisted design method is added to the chest.</p> <p>Style 3: Designed to emphasize the amount of movement in the chest and back with a flap-fold design method.</p>				
















**Table 9** “O” Silhouette Cutting of “one-piece” Draping Structure of Dulong Costume

<b>Experiment Group A: “One-piece” Draping (O-contour)</b>				
Repeat (style 4)				
				
Torsion (Style 5)				
				
Folds (Style 6)				
				
Summary				
<p>Style 4: This style focuses on the design of the waist and the space between the chest and the back and uses the repetition of the points design method.</p> <p>Style 5: This style focuses on the structural design of the chest and back, with a twisted design method added to the back.</p> <p>Style 6: Designed to emphasize the amount of movement between the bust and waist, with a pleated design method.</p>				
















**Table 10** “S” Silhouette Tailoring of “one-piece” Draping Structure of Dulong Costume

<b>Experiment Group A: “One-piece” Draping (S contour)</b>				
Torsion (Style 7)				
				
Split (Style 8)				
				
Repeat (style 9)				
				
Summary				
<p>Style 7: This style focuses on hip and leg space design and uses a twisted design method.</p> <p>Style 8: Focusing on the structural design of the chest, waist, and back, the overall design method of dividing but not cutting is added.</p> <p>Style 9: Designed to emphasize the amount of movement in the chest and waist, this style uses repeating lines as a design method.</p>				













**Table 11** “A” Silhouette Cutting of the “one-piece” Winding Structure of Dulong Costume

<b>Experiment Group B: “One-piece” winding (A profile)</b>				
Torsion (Style 10)				
				
Repeat (style 11)				
				
Folds (style 12)				
				
Summary				
<p>Style 10: This style focuses on the structural design of the waist and hips, using a twisted design method.</p> <p>Style 11: Focusing on the structural design of the neck and back, the design method of repeating lines is used.</p> <p>Style 12: Focusing on the structural design of the chest and waist, the hip This style focuses on the amount of movement and adopts a pleated design method.</p>				

**Table 12** Production of “O” Silhouette of “one-piece” Winding Structure of Dulong Costume















<b>Experiment Group B: “One-piece” winding (O-contour)</b>				
Folding (Style 13)				
				
Torsion (Style 14)				
				
Folds (style 15)				
				
Summary				
<p>Style 13: This style focuses on the structural design of the chest and uses the flip-fold design method.</p> <p>Style 14: This style focuses on the structural design of the chest, using a drawstring design method;</p> <p>Style 15: Designed to emphasize the amount of movement between the bust and waist, with a pleated design method.</p>				

**Table 13** Production of “X” Silhouette Tailoring for “one-piece” Winding Structure of Dulong Clothing

<b>Experiment Group B: “One-piece” winding (X-contour)</b>				
Folding (Style 16)				
				
Segmentation (style 17)				
				
Folds (style 18)				
				
Summary				
<p>Style 16: This style focuses on the structural design of the waist and hips, using the design method of folding.</p> <p>Style 17: Focusing on the structural design of the chest with the waist and hips, the design method of dividing but not cutting is added.</p> <p>Style 18: This style focuses on the structural design of the chest and waist with a pleated design method.</p>				














**Table 14** “X” Silhouette Tailoring of “one-piece” Overlapping Structure of Dulong Costume

<b>Experiment Group C: “One Piece” Overlays (A profile)</b>				
Folds (style 19)				
				
Split (style 20)				
				
Torsion (style 21)				
				
Summary				
<p>Style 19: This style This style focuses on the structural design of the chest and waist and uses a pleated design method.</p> <p>Style 20: Focusing on the structural design of the chest and waist, hips, and the design of the sense of space, adding the design method of dividing but not cutting.</p> <p>Style 21: Focusing on the structural design of the neck with a twisted design method.</p>				

**Table 15** “O” Silhouette Cutting of “one-piece” Overlay Structure of Dulong Costume

<b>Experiment Group C: “One Piece” Overlays (O-contour)</b>				
Torsion (style 22)				
				
Drawdown (style 23)				
				
Folds (style 24)				
				
Summary				
<p>Style 22: This style focuses on the structural design of the chest and waist, using a twisted design method.</p> <p>Style 23: Focusing on the structural design of the chest and waist, the arms are designed with a sense of space, and the design method of pumping is added.</p> <p>Style 24: This style focuses on the structural design of the chest and waist with a pleated design method.</p>				

**Table 16** *Dulong Clothing “one-piece” Overlapping Structure “S” Silhouette Tailoring Production*

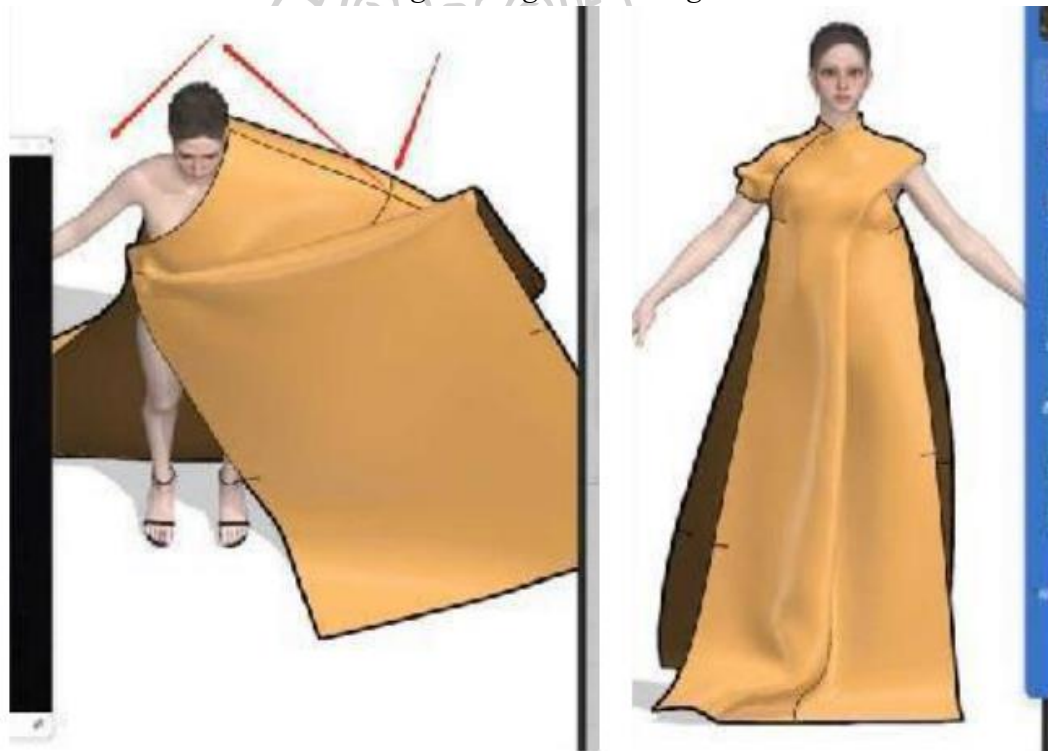
<b>Experiment Group C: “One Piece” Overlays (S contour)</b>				
Folds (style 25)				
				
Torsion (style 26)				
				
Repeat (style 27)				
				
Summary				
<p>Style 25: This style uses a pleated design method to focus on the structural design of the chest and waist.</p> <p>Style 26: This style focuses on the structural design of the chest and waist, using a twisted design method.</p> <p>Style 27: Focusing on the structural design of the chest with the waist and hips, the design method of repeating lines is used.</p>				

#### 4.7.5 CLO3D EVALUATION AND ANALYSIS OF THE RESULTS OF THE STANDING CUT EXPERIMENTS

According to the results of the Dulong women's clothing preference questionnaire to analyze the Dulong women's average body type and the posture that they keep more time in daily life, the model of this tailoring experiment was chosen to have a height of 155cm, a chest circumference of 82.2cm, a hip circumference of 83.7cm, a thigh circumference of 48.1cm, and a calf circumference of 28.9cm, and a body weight of 45.5kg. The postures were chosen to be the standing posture, the walking posture, the daily sitting posture, and the weaving posture. Weaving posture.

##### 4.7.5.1 CLO3D DRAWING PROCESS

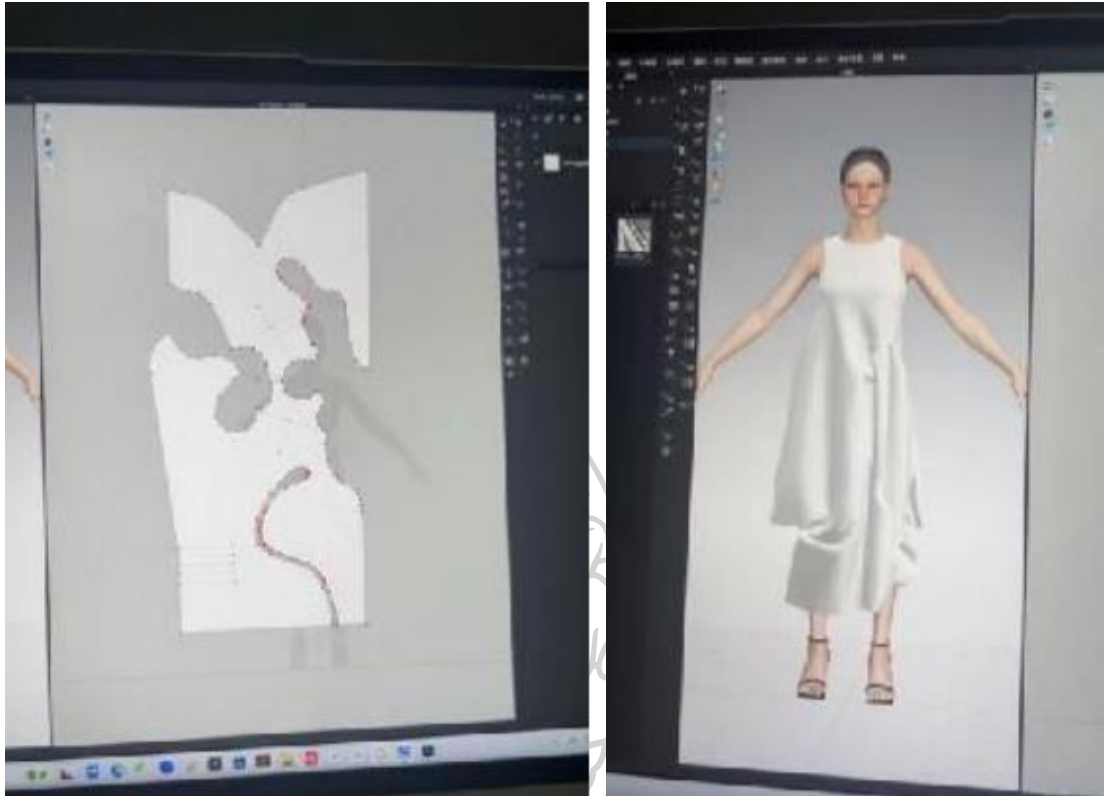
**Figure 88** *CLO3D Virtual Standing, Cutting, and Sewing*



*Note.* Figure by the author

**Figure 89** CLO3D 2D Platemaking Window

**Figure 90** CLO3D Virtual Garment-Making Effect Display







*Note.* Figure by the author





#### **4.7.5.2 EVALUATION OF STYLE 1**

In the experimental results of the “one-piece” draping structure A silhouette in group A, style 1 was selected for CLO3D garment fit evaluation according to the summary analysis, and the evaluation results are as follows:





**Table 17** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 1 of CLO3D*

Style 1	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 18** *Virtual Display and Garment Stress Evaluation of Stand-up Styles 1 of CLO3D Walking Posture*





Style 1	Walking test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 19** *Virtual Display and Garment Pressure Evaluation of Vertical Cut Style 1 of CLO3D Daily Sitting Dynamic*

Style 1	Daily Sitting Test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				







**Table 20** *Virtual Display and Garment Stress Evaluation of Vertical Cut Style 1 of CLO3D Weaving Sitting Dynamic*

Style 1	Weaving sitting test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





#### 4.7.5.3 EVALUATION OF STYLE 4

In Group A, “one-piece” draping structure O silhouette experiment results, according to the summary analysis, style 4 was selected for CLO3D garment fit evaluation, and the evaluation results are as follows:


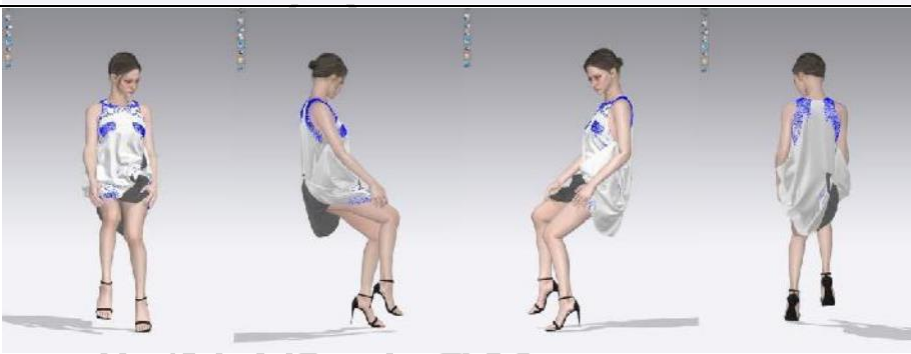


**Table 21** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 4 of CLO3D*

Style 4	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

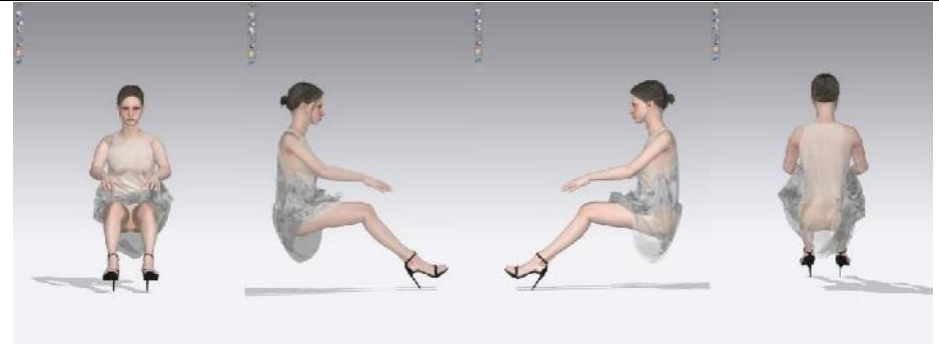
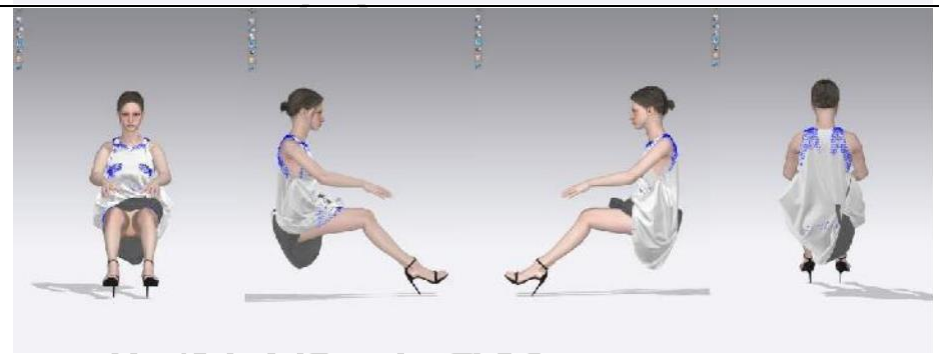
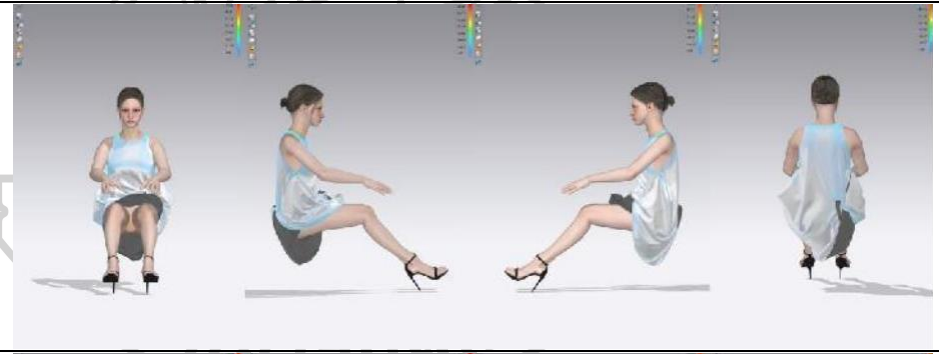
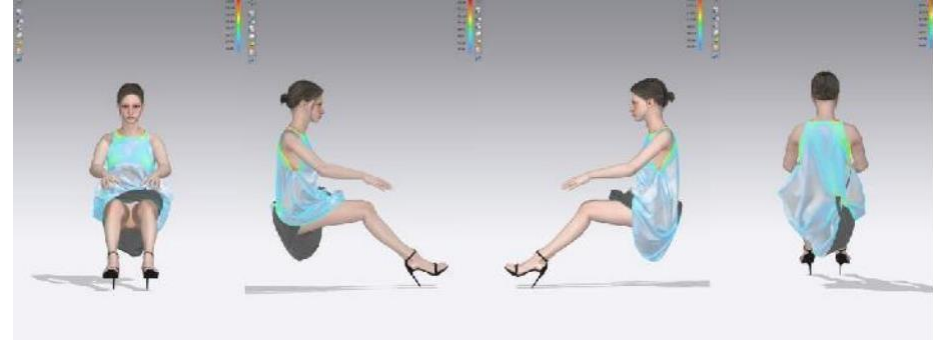
**Table 22** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 4 of CLO3D Walking Posture*

Style 4	Walking test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 23** *Dynamic Virtual Display and Garment Pressure Evaluation of Vertical Cut Style 4 of CLO3D Daily Sitting*

Style 4	Daily Sitting Test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





**Table 24** *Dynamic Virtual Display and Garment Pressure Evaluation of Vertical Cut Style 4 of CLO3D Weaving Sitting*

Style 4	Weaving sitting test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

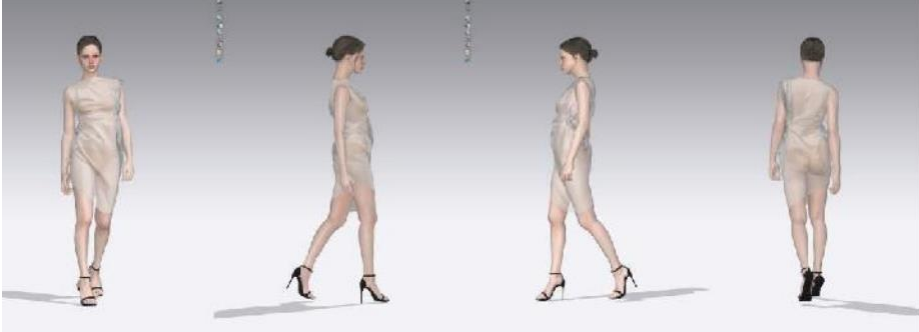



#### 4.7.5.4 EVALUATION OF STYLE 9

In Group A, “one-piece” draping structure S silhouette experimental results, according to the summary analysis, style 9 was selected for CLO3D garment fit evaluation, and the evaluation results are as follows.




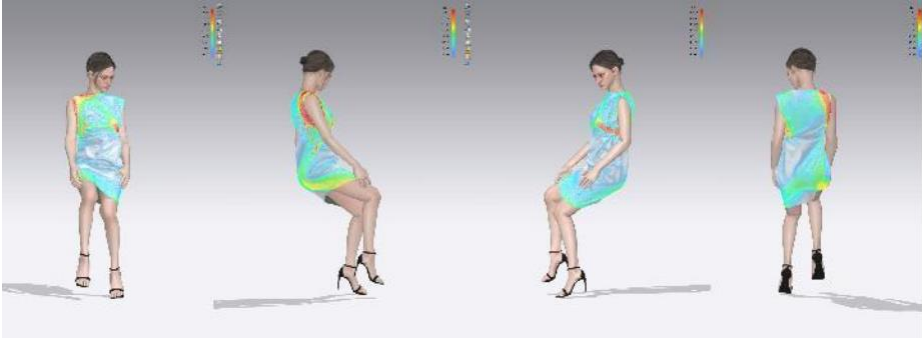
**Table 25** *Dynamic Virtual Display and Garment Pressure Measurement of Standing Cut Style 9 of CLO3D*

Style 9	Standing test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	

**Table 26** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 9 of CLO3D Walking Posture*

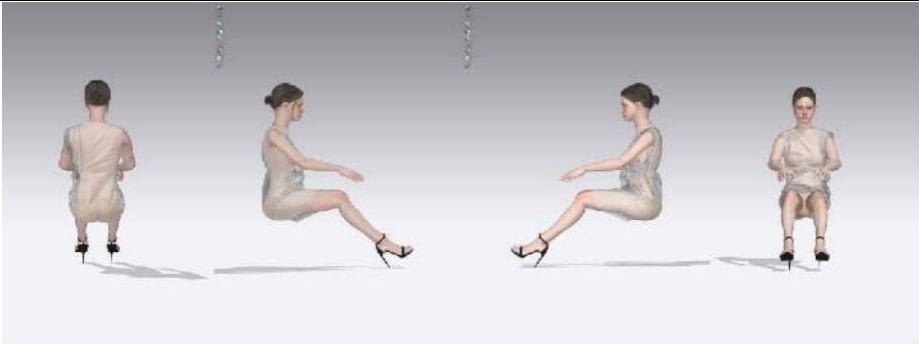

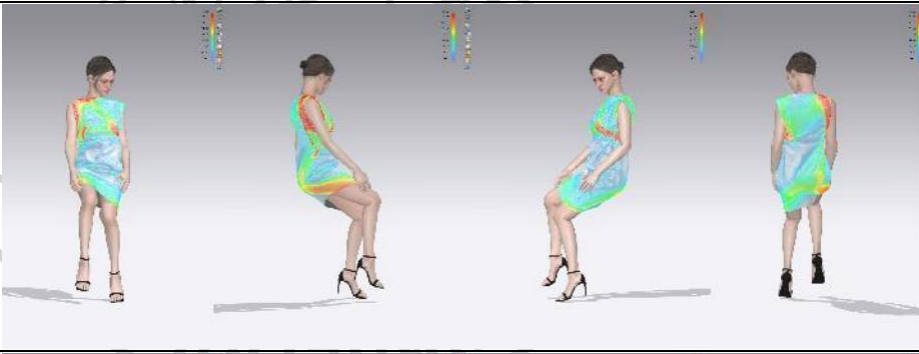

Style 9	Walking test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	

**Table 27** *Dynamic Virtual Demonstration and Garment Pressure Evaluation of Vertical Cut Style 9 of CLO3D Woven Sitting*

Style 9	Daily Sitting Test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	



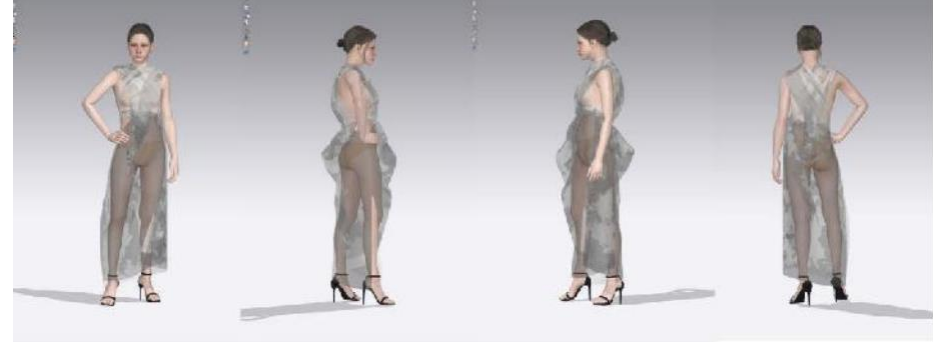



**Table 28** *Dynamic Virtual Demonstration and Garment Pressure Evaluation of Vertical Cut Style 9 of CLO3D Woven Sitting*

Style 9	Weaving sitting test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	





#### 4.7.5.5 EVALUATION OF STYLE 12

In the results of the “one-piece” winding structure, A silhouette experiment in group B, style 12 was selected for CLO3D garment fit evaluation based on the summary analysis, and the evaluation results are as follows:





**Table 29** *Dynamic Virtual Display and Garment Pressure Evaluation of Standing Cut Style 12 of CLO3D*

Style 12	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





**Table 30** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 12 of CLO3D Walking*

Style 12	Walking test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	

**Table 31** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 12 of CLO3D Daily Sitting*

Style 12	Daily Sitting Test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





**Table 32** *Dynamic Virtual Demonstration and Garment Pressure Evaluation of Vertical Cut Style 12 of CLO3D Weaving Sitting*

Style 12	Weaving sitting test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	





#### 4.7.5.6 EVALUATION OF STYLES 14

In Group B, “one-piece” winding structure O silhouette experiment results, according to the summary analysis, style 14 was selected for CLO3D garment fit evaluation, and the evaluation results are as follows:




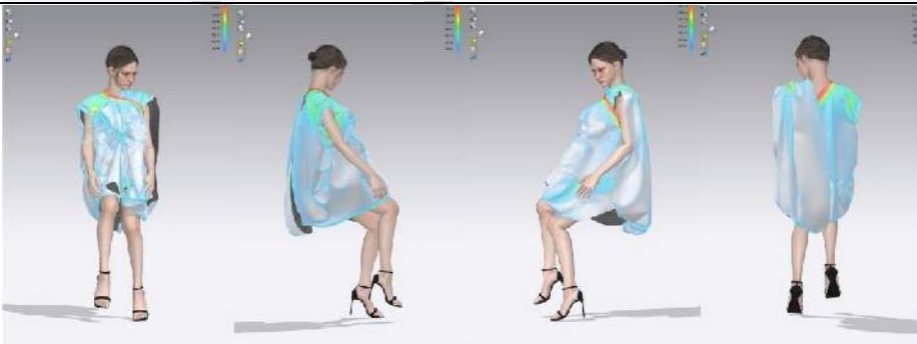
**Table 33** *Dynamic Virtual Display and Garment Pressure Evaluation of Standing Cut Style 14 of CLO3D*

Style 14	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 34** *Dynamic Virtual Display and Garment Stress Evaluation of Standing Cut Style 14 of CLO3D Walking*

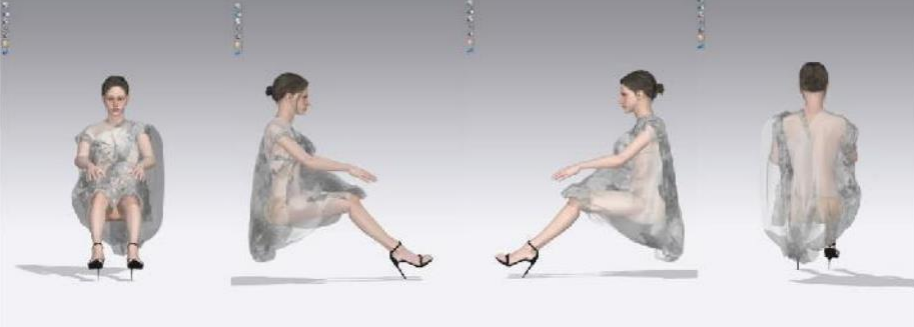



Style 14	Walking test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 35** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 14 of CLO3D Daily Sitting*

Style 14	Daily Sitting Test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	






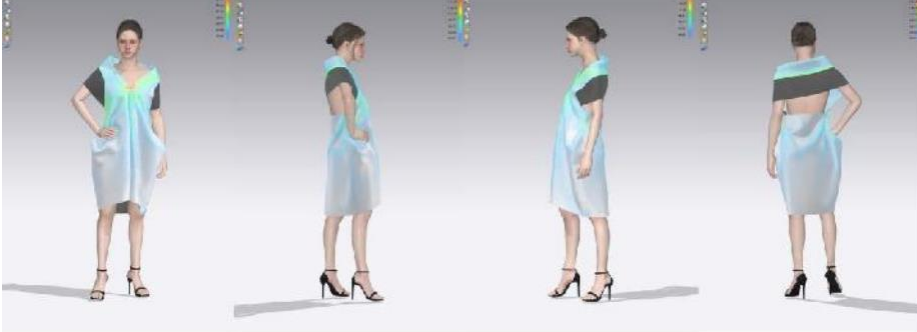
**Table 36** *Dynamic Virtual Display and Garment Pressure Evaluation of Vertical Cut Style 14 of CLO3D Woven Sitting*

Style 14	Weaving sitting test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	




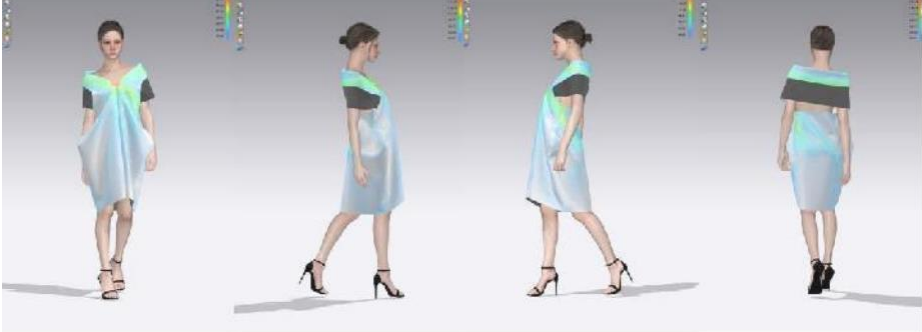
#### 4.7.5.7 EVALUATION OF STYLE 16

In Group B, the results of the “one-piece” winding structure X silhouette experiment were summarized and analyzed, and Style 16 was selected for the CLO3D garment fit evaluation and the results were as follows:




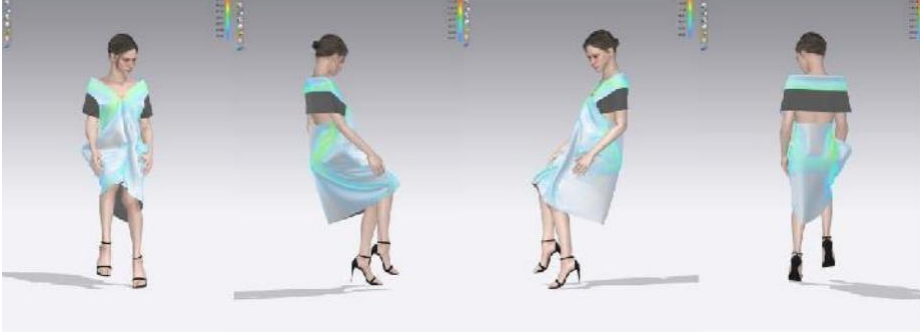
**Table 37** *Dynamic Virtual Display and Garment Pressure Evaluation of Stand-up of Silhouette Style 16 of CLO3D*

Style 16	Standing test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	

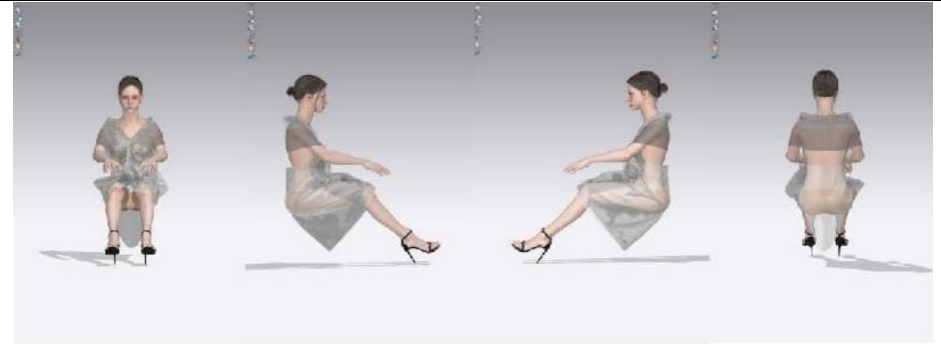
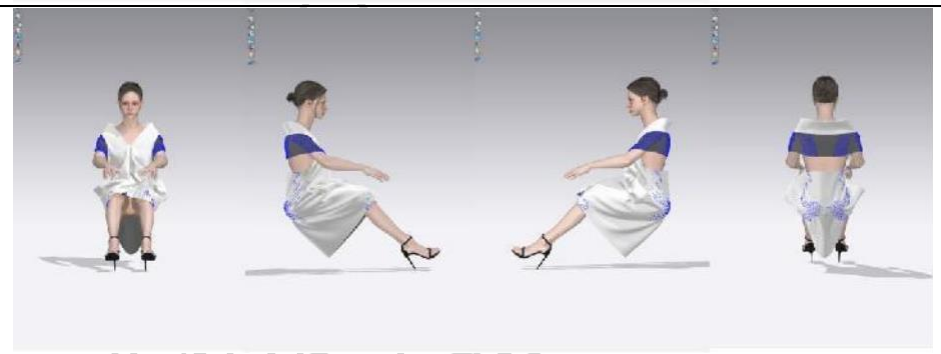

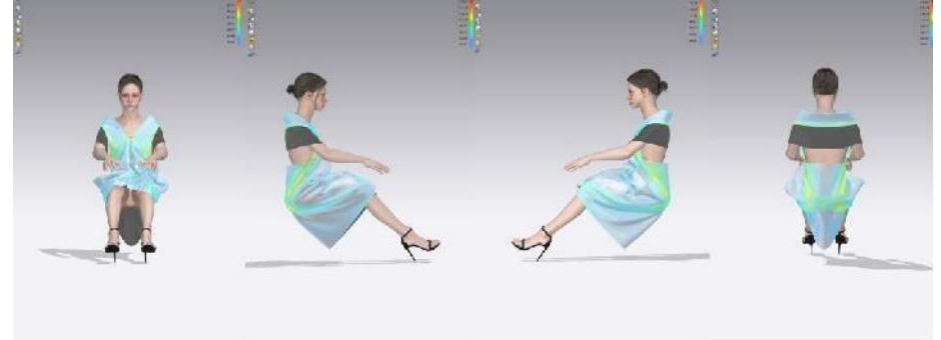
**Table 38** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 16 of CLO3D Walking*

Style 16	Walking test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	

**Table 39** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 16 of CLO3D Daily Sitting*

Style 16	Daily Sitting Test
Clothing perspective drawing	
Pressure point contact diagram	
Pressure diagram	
Stress diagram	





**Table 40** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 16 of CLO3D Weaving Sitting*

Style 16	Weaving sitting test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





#### 4.7.5.8 EVALUATION OF STYLE 19

In Group C, the results of the “one-piece or multi-piece” overlay structure A silhouette experiment, Style 19 was selected for the CLO3D garment fit evaluation based on the summary analysis, and the results are as follows:





**Table 41** *Dynamic Virtual Display and Garment Pressure Evaluation of Standing Cut Style 19 of CLO3D Standing Sitting*

Style 19	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 42** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-up Style 19 of CLO3D Walking*

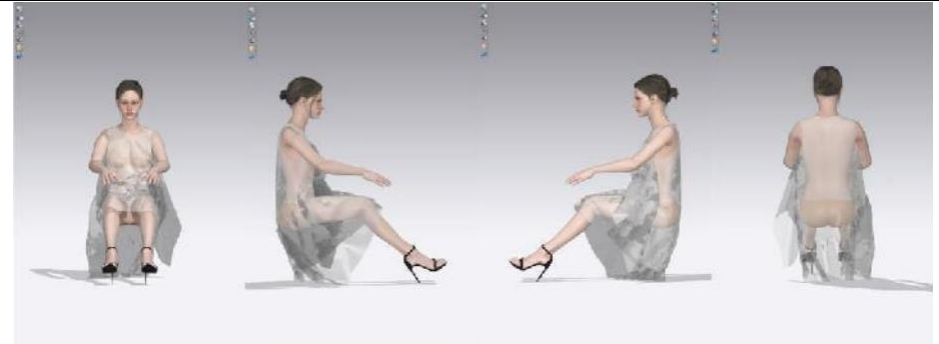
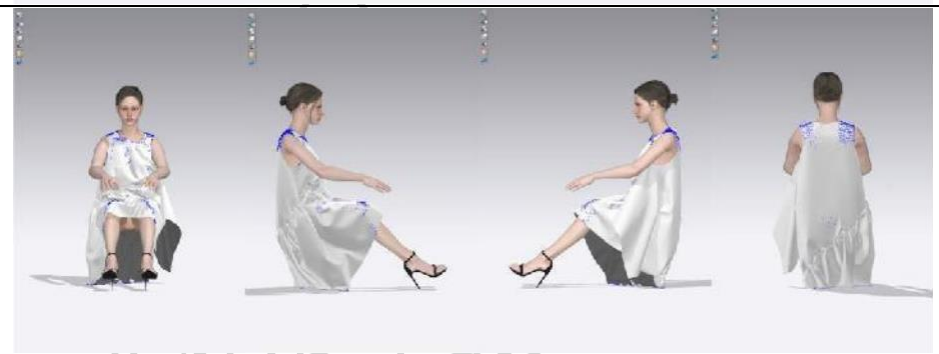


Style 19	Walking test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 43** *Dynamic Virtual Display and Garment Pressure Evaluation of Stand-up Style 19 of CLO3D Daily Sitting*

Style 19	Daily Sitting Test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				






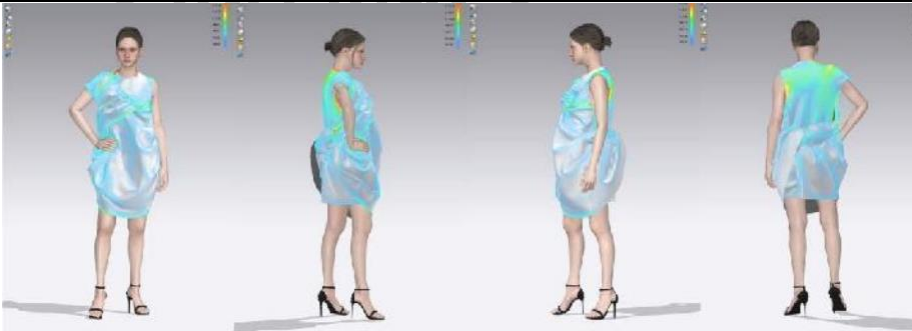
**Table 44** *Dynamic Virtual Display and Garment Pressure Evaluation of Vertical Cut Style 19 of CLO3D Woven Sitting*

Style 19	Weaving sitting test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				





#### 4.7.5.9 EVALUATION OF STYLE 22

In Group C, the results of the “one-piece or multi-piece” overlay structure 0 silhouette experiment, style 22 was selected for CLO3D garment fit evaluation based on the summary analysis, and the results are as follows:





**Table 45** *Dynamic Virtual Display and Garment Stress Evaluation of Stand-Up Style 22 of CLO3D*

Style 22	Standing test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 46** *Dynamic Virtual Display and Garment Pressure Evaluation of Stand-up Style 22 of CLO3D Walking*

Style 22	Walking test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

**Table 47** *Dynamic Virtual Display and Garment Pressure Evaluation of Standing Style 22 of CLO3D Daily Sitting*

Style 22	Daily Sitting Test			
Clothing perspective drawing				
Pressure point contact diagram				
Pressure diagram				
Stress diagram				

Using CLO3D to draw the layout of 9 sets of stand-up tailoring experimental results of clothing styles as well as the human body virtual try-on clothing pressure evaluation, the above evaluation chart, blue indicates that the clothing styles for the human body pressure are more appropriate, can achieve a relatively comfortable

wearing experience, the yellow part of the clothing that the structure of the pressure on the human body parts of the pressure is slightly larger, but does not affect the wearing experience, did not reach the wearing of the feeling of uncomfortable. The red part indicates that the garment's structure puts greater pressure on the human body parts, affecting the actual wearing experience, and the wearer will feel uncomfortable and inconvenient moving the body.

The results of the four dynamic measurements of the human body were taken into account to select the most suitable garment pattern for the human body to be made into a ready-made garment to show the results of this research. Based on the results shown in the above measurement chart, three sets of style 1, style 16, and style 22 were selected.

#### 4.7.6 COLOR ANALYSIS OF WORKS

Through the analysis in the study of the uniqueness of Dulong traditional costumes in Chapter 2, the colorful and unique Dulong blankets and the whole-body striped pattern are one of the uniqueness of Dulong traditional costumes;

Through the results of the interviews and questionnaires of Dulong women in Chapter 3, it was analyzed that the rich color of Dulong blankets is a major feature that distinguishes them from the color of other ethnic costumes, and Dulong women still like the colorful Dulong traditional costumes, and for the improved design of Dulong traditional costumes, Dulong women's opinion is to retain the feature of the rich color combination of Dulong traditional costumes;

Dulong women still prefer colorful clothing with five or more colors, and the percentage of data from the questionnaire survey is 53.61% and 29.9%, respectively (see Figure 91).

**Figure 91** Survey Results of the Questionnaire on the Color Preference of Dulong Women's Favorite Clothing

15、您喜欢穿什么颜色的衣服? [单选题]

选项	小计	比例
A、单一颜色	11	11.34%
B、三种颜色	5	5.15%
C、五种颜色	52	53.61%
D、五种以上	29	29.9%
本题有效填写人次	97	

Dulong women believe that the colors and patterns of Dulong traditional clothing are meaningful to Dulong women, with 83.51% of the data from the questionnaire (see Figure 92).

**Figure 92** Survey Results of the Questionnaire on the Degree of Influence of the Colors and Patterns of Dulong Traditional Clothing on Dulong Women

16、独龙族传统服装的色彩或图案对您来说有特殊意义吗? [单选题]

选项	小计	比例
A、有	81	83.51%
B、没有	16	16.49%
本题有效填写人次	97	

In the survey results of the questionnaire of young women, young women's preference for clothing color, modern young women's love for dark colors, neutral colors, bright colors of the number of people accounted for a higher proportion of the number of people preferring light colors, like the number of people accounted for a low proportion, the data accounted for the proportion of the dark colors of 30.57%, the neutral colors of 32.57%, the bright colors of 26%, the light colors of 10.86% (see Figure 93).

**Figure 93** Survey Results of the Questionnaire on Young Women's Clothing Color Preferences

8、您对于的颜色偏好是: [单选题]

选项	小计	比例
A、浅色系 (白色、粉色等)	38	10.86%
B、深色系 (黑色、蓝色等)	107	30.57%
C、鲜艳色彩 (红色、绿色等)	91	26%
D、中性色 (灰色、棕色等)	114	32.57%
E、其他 (请注明) [详细]	0	0%
本题有效填写人次	350	

Through the research and analysis of the color of Dulong traditional clothing in Chapter 4, it is concluded that the Dulong traditional clothing has three color schemes (see Figures 94, 99, and 104), and the research design is based on the retention of the three major color schemes of the Dulong traditional clothing, and the addition of the same or contrasting colors in each color scheme, so as to make the original color scheme have more neighboring colors as well as contrasting colors, and to increase the color level and make the traditional Dulong traditional clothing more rich and

tonal unity. Color levels, so that the traditional Dulong clothing color is richer and tone unique.

Step 1: Paint the stripe pattern according to the original stripe color as well as the order in which they are arranged (see Figures 95, 100, and 105)

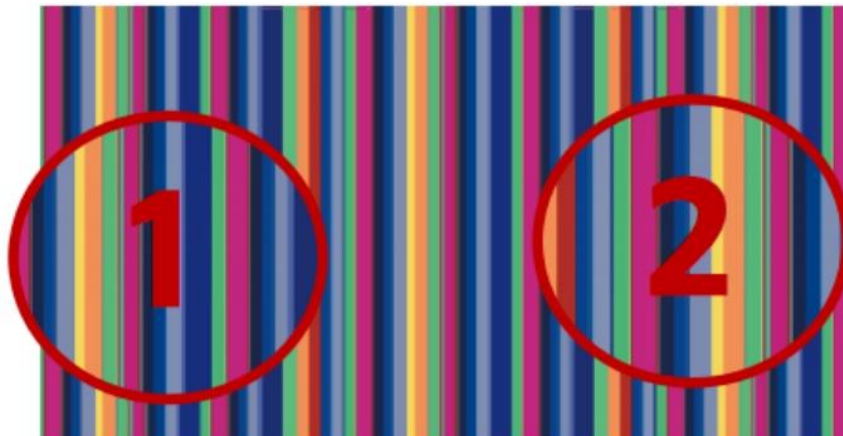
Step 2: Using computer graphics software in the color palette, select the original stripe color; in the color palette around the drawing of the neighboring colors used to match, arrange in the original color between the stripes, arranged in an area of not more than 2cm, not less than 0.4cm.

#### 4.7.6.1 STUDY ON THE COLOR 10F THE WORKS

**Figure 94** *Colors of Dulong Traditional Clothing*



**Figure 95** *Computerized Collation of Colorful Stripe Patterns*



Using computer graphics, draw different shades of blue from the color palette in your graphics software to add layers of stripe patterns (see Figure 96).

**Figure 96** *The Color Picking Process of Drawing Software*



(2) Using computer graphics, draw different shades of green, orange, etc. from the color palette in your graphics software to add layers of stripe patterns (see Figure 97).

**Figure 97** *The Color Picking Process of Drawing Software*



After the above research process, the stripe color arrangement results are as follows (see Figure 98):

**Figure 98** *Improved Colors of Dulong Traditional Clothing*





#### 4.7.6.2 STUDY ON THE COLOR 2 OF THE WORKS

**Figure 99** *Colors of Dulong Traditional Clothing*



**Figure 100** *Computerized Collation of Colorful Stripe Patterns*



Using a computer drawing, draw in the color palette around the blue and black in your drawing software (see Figure 101).

**Figure 101** *The Color Picking Process of Drawing Software*



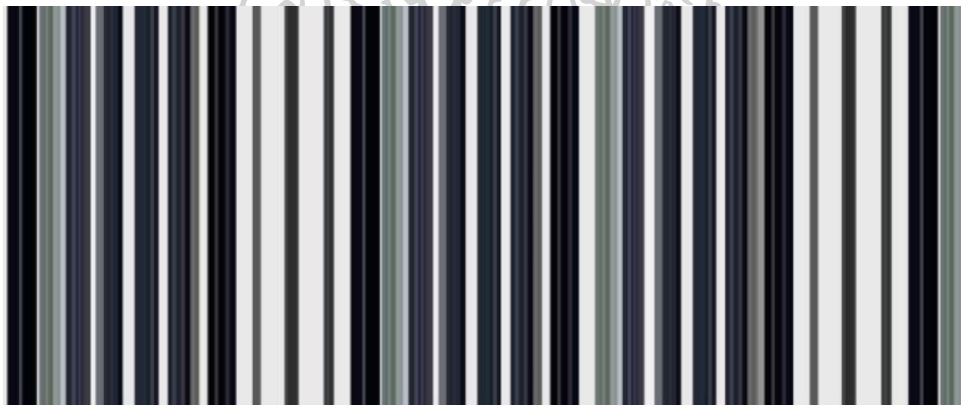
Using a computer drawing, draw in the color palette around the blue-gray in your drawing software (see Figure 102).

**Figure 102** *The Color Picking Process of Drawing Software*



After the above research process, the stripe color arrangement results are as follows (see Figure 103)

**Figure 103** *Improved Colors of Dulong Traditional Clothing*



#### 4.7.6.3 STUDY ON THE COLOR 3 OF THE WORKS

**Figure 104** *Colors of Dulong Traditional Clothing*



**Figure 105** *Computerized Collation of Colorful Stripe Patterns*



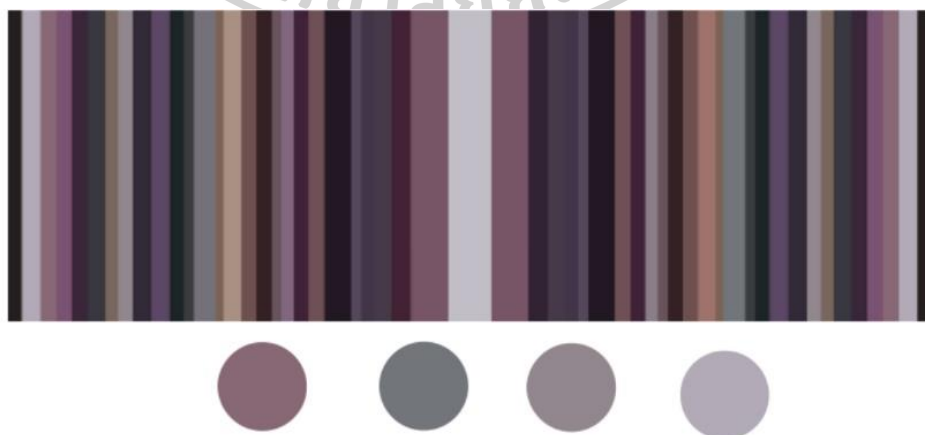
(1) Using a computer drawing, draw the colors around the yellow and blue in the palette in your drawing software (see Figure 106).

**Figure 106** *The Color Picking Process of Drawing Software*



(2) Using computer graphics, add the purple and the neighboring colors around the purple (see Figure 107).

**Figure 107** *The Color Picking Process of Drawing Software*



(3) Using a computer drawing, draw on the color palette in the drawing software to draw on the colors in the red color family (see Figure 108).

**Figure 108** *The Color Picking Process of Drawing Software*



After the above research process, the stripe color arrangement results are as follows (see Figure 109).

**Figure 109** *Improved Colors of Dulong Traditional Clothing*



#### 4.7.7 DISPLAY OF WORKS RENDERINGS

Based on the garment style assessment in the above study, three garments were selected from Group A's "one-piece" drape, Group B's "one-piece" wrap, and Group C's "one-piece" two-piece stacked garments, and one set from each of the three "wearing styles" was selected. Three sets of garments were selected for each of the three "wearing styles", and one set was selected for each.

After determining the style of the garment, three separate renderings were drawn for each set of garments, combining the three color combinations developed from the above color study.

#### 4.7.7.1 STYLE 1 RENDERINGS

In the experiments of standing cuts of garment styles in group A, the style 1, based on the measurements of the 4 dynamics of the garments, produced the better result (see Figure 110).

**Figure 110** Virtual Model Trying on Tailored Style 1 of CLO3D

**Figure 111** Effective Drawing of Vertical Cutting Style 1



#### 4.7.7.2 STYLE 16 RENDERINGS

In Group B garment style stand-up experiments, the better result was style 16 (see Figure 112), based on the measurement of the four dynamics of the garment.

**Figure 112** Virtual Model Trying on Tailored Style 16 of CLO3D

**Figure 113** Effective Drawing of Vertical Cutting Style 16



#### 4.7.7.3 STYLE 22 RENDERINGS

In the experiment of clothing styles of group C, style 22 (see Figure 114) achieved the better result based on the measurement of the 4 dynamics of clothing.

**Figure 114** *Virtual Model Trying on Tailored Style 22 of CLO3D*

**Figure 115** *Effective Drawing of Vertical Cutting Style 22*



#### 4.7.8 FABRIC ANALYSIS

The traditional Dulong blanket fabric is made of hemp and twine. Because of the colorfulness of Dulong blankets, the traditional dyeing and spinning processes take more time for Dulong women to spin them. This research uses a modern double-sided digital printing process to reduce labor and time costs.

Double-sided digital printing is a digital printing technology that outputs the designer's creative pattern directly onto the textile through a computer program. Compared with traditional printing and dyeing technology, double-sided digital printing can greatly improve production efficiency and reduce production costs while realizing the advantages of personalized customization and waste-free production.

In order to highly restore the color and material of the traditional Dulong carpet, this time the author chose to use imitation linen fiber for double-sided printing process. Imitation linen fiber refers to a fiber that has the appearance and wearing performance of natural linen by physical or chemical modification methods. The raw materials of imitation linen fiber include polyester, acrylic, acetate fiber and viscose fiber, among which polyester filament and acrylic staple fiber have the best imitation linen effect. (1) Polyester fiber (Figure 116) : It is a fiber-forming polymer made of

purified terephthalic acid (PTA) or dimethyl terephthalate (DMT) and ethylene glycol (MEG) through esterification or ester exchange and polycondensation reaction, and is made of polyethylene terephthalate (PET) through spinning and post-treatment. From the perspective of the molecular composition of polyester, it is composed of short aliphatic hydrocarbon chains, ester groups, benzene rings, and terminal alcohol hydroxyl groups. In addition to the two terminal alcohol hydroxyl groups, there are no other polar groups in polyester fibers, so the hydrophilicity of polyester fibers is extremely poor. Polyester molecules contain about 46% ester groups. Ester groups can undergo hydrolysis and thermal cracking at temperatures above 200°C. They can undergo saponification when exposed to strong alkali, which reduces the degree of polymerization. Ordinary detergents and washing powders below 100°C have no effect on polyester. Characteristics of polyester: high strength, good elasticity, good heat resistance, thermal insulation, wear resistance, corrosion resistance, and not easy to fade. (2) Acrylic fiber: Acrylic fiber (PAN fiber) (Figure 117) usually refers to a synthetic fiber made by wet spinning or dry spinning of a copolymer of more than 85% acrylonitrile and a second and third monomer. Acrylic fiber is soft and has good warmth retention, and its texture is similar to wool. Machine-treated acrylic fiber can also be used to imitate other natural fiber materials such as cotton. It has good light resistance and is very elastic. Acrylic fiber also has shortcomings compared to natural fibers. For example, it often needs to be preheated to become soft, and as a substitute for wool, its warmth retention is slightly inferior in humid environments. Some hand knitters believe that acrylic fiber is not easy to knit because it lacks stretchability. In addition, it is more flammable than natural fibers. (3) Acetate fiber: Acetate fiber (Figure 118) is a fiber made by spinning cellulose acetate produced by the reaction of cellulose and acetic anhydride. It is a semi-synthetic fiber material. According to the degree of esterification, it is divided into two categories: diacetate and triacetate. Acetate fiber softens at 200°C ~ 230°C and melts at 260°C. It has good thermoplasticity and permanent deformation. Acetate fiber can usually be dyed with disperse dyes and has good coloring performance. (4) Viscose fiber: Viscose fiber (Figure 119) is a man-made fiber regenerated from natural cellulose through chemical reaction. The raw materials of viscose fiber are mainly cotton pulp and wood pulp. Soluble cellulose xanthate is made through alkalization and sulfonation processes, and then dissolved in dilute alkali solution to make viscose. Viscose fiber has good hygroscopicity, air permeability, dyeability and spinnability.

**Figure 116** *Polyester fiber***Figure 117** *Acrylic fiber*

*Note.* Figure from the Internet

**Figure 118** *Acetate fiber***Figure 119** *Viscose fiber*


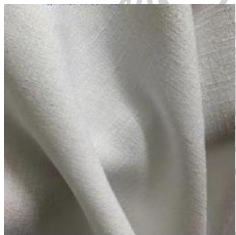



*Note.* Figure from the Internet

Processing methods of linen-like fibers: (1) Blending with linen fibers to maintain the style and appearance of linen while giving chemical fibers the quick-drying, good strength and wrinkle resistance; (2) Processing of filaments to imitate staple fibers, such as air texturing combined with special false twisting such as false twisting, compound twisting and heavy twisting, to make single or compound processed yarns, giving them the unique thick sections, luster and stiffness of linen; (3) Blending and spinning of different staple fibers to produce a combination yarn with multi-layer properties, giving the mixed yarn the breathability, softness, stiffness and dryness.




After the above research, the author entered the fabric market and conducted fabric screening.



**Table 48** *Fabric Screening Analysis*

Fabric name	fabric pictures	Fabric properties	Fabric parameters
Snowflake hemp		There is slight stretch on all four sides, and the fabric has a rough texture with clear lines.	Composition: 100% polyester Weight: 200 g/m Elasticity: Slightly elastic Softness: Moderate Thickness: Regular
Bamboo hemp		There is slight stretch on all four sides, and the lines of the linen texture are clear.	Composition: 100% polyester Weight: 217 g/m Elasticity: Slightly elastic Softness: Moderate Thickness: Regular
Imitation hemp		It is completely non-elastic, has good breathability, and has a clear linen texture.	Composition: 15% cotton + 85% polyester Weight: 200 g/m Elasticity: non-elastic Softness: moderate Thickness: regular
Grain hemp		There is no stretchiness overall, the fabric texture is slightly coarse, and the drape is good.	Composition: 35% cotton + 65% polyester Weight: 400 g/m Elasticity: no elasticity Softness: hard Thickness: thick
Imitation hemp		It has slight elasticity overall, feels hard, and has strong shaping ability.	Composition: 100% polyester Weight: 200 g/m Elasticity: Slightly elastic Softness: Moderate Thickness: Regular

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Hemp bamboo knot		There is no elasticity overall, and the texture of the bamboo nodes is relatively clear.	Composition: 87% polyester + 11% cotton + 2% spandex Weight: 240 g/m Elasticity: non-elastic Softness: moderate Thickness: regular
Ling Long hemp		There is no stretchiness overall, the linen texture is obvious, and the Breathability is good.	Composition: 100% polyester Weight: 240 g/m Elasticity: Non-elastic Softness: Moderate Thickness: Regular
Fine Tencel hemp		It has no elasticity overall, is relatively breathable and feels soft.	Composition: 100% polyester Weight: 120 g/m Elasticity: No stretch Softness: Softer Thickness: Thin

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According to the above analysis of fabric texture, grain and other material, and other materials, the Dulong traditional material fabrics were superior to the choice of bamboo hemp and linen bamboo two-r digital double-sided printing.

Fabric 1: Double-sided printing sample of bamboo hemp fabric, front (see Figure 120) and back (see Figure 121) are shown, size is A3.

**Figure 120** *Sample of Double-sided Printed Fabric*

**Figure 121** *Sample of Double-sided Printed Fabric*



Fabric 2: Double-sided printing sample of hemp bamboo fabric, front side (see Figure 122, 123) and back side (see Figure 124, 125) are shown, size is A3:

**Figure 122** *Small Sample of Double-sided Printed Fabric*

**Figure 123** *Small Sample of Double-sided Printed Fabric*



**Figure 124** *Small Sample of Double-sided Printed Fabric*

**Figure 125** *Small Sample of Double-sided Printed Fabric*



Finally, based on the effect of the fabric sample, we chose linen bamboo for the production of this garment.

#### 4.7.9 DISPLAY OF FINISHED WORKS

**Figure 126** *Finished Work 1*



**Figure 127** *Finished Work 2*



Figure 128 *Finished Work 3*



#### 4.8 SUPERVISOR'S REVISION SUGGESTIONS

Full-body striped clothing is only favored by Dulong women. To promote and develop clothing with traditional Dulong characteristics for the broader society, targeting young women aged 20-25, this study should combine the colors of traditional Dulong clothing with the color trends of 2025. Based on these revision suggestions, the clothing effect diagrams were drawn below.

**Figure 129** *Renderings of the Dulong Clothing*



**Figure 130** *Renderings of the Dulong Clothing*



**Figure 131** *Renderings of the Dulong Clothing*



#### 4.8.1 FINISHED GARMENT DISPLAY

**Figure 132** *Finished Garment Display*



#### 4.9 BODY FITTING OF THE RESEARCH WORKS AND INTERVIEWS

**Table 49** Information on the Wearers of the Works and Statistics of Interview Results

Wearer information	Fitting photos	Results of the interviews
<p>Name: Wang Jiamin            Height; 163cm            Weight: 53kg            Age: 23            Tel: 19982075830            Home Address:            Southwest University of            Finance and Economics,            Chengdu, Sichuan,            China</p>		<p>Style Favorite: 8.8            Comfort level: 8.5            Color Favorite: 8            Everyday wear: the            tester thought it could be            worn for everyday travel            but would not wear it in            a work environment.</p>
<p>Name: Tang Shiyun            Height; 163cm            Weight: 55kg            Age: 23            Tel: 15211085388            Family Address: Hao            Long Music Realm,            Wangcheng District,            Changsha City, Hunan            Province, China</p>		<p>Style Favorite: 8.5            Comfort level: 7.5            Favorite Color: 8.5            Everyday wear: the            testers found it wearable            for daily travel and            work.</p>
<p>Name :He Peiqi            Height: 155cm            Weight: 56kg            Age: 23            Tel: 13107335553            Home Address: Fuhao            District, You County,            Zhuzhou City, Hunan            Province, China</p>		<p>Style Favorite: 7.5            Comfort level: 7            Favorite Color: 7.5            Everyday wear: the            tester thought the            garment was a size too            small; if the size fits, the            garment can be worn for            everyday travel.</p>



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Name: Lei Yixia  
Height: 163cm  
Weight: 55kg  
Age: 25 years  
Phone number:  
15008716173  
Home address: No. 1  
Park, Pu'er City,  
Yunnan Province, China



Style Favorite: 8.5  
Comfort level: 8  
Color Favourite: 8  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

Name: Qin Yuxia  
Height: 166cm  
Weight: 51kg  
Age: 24  
Tel: 18907838766  
Family Address:  
Dongjiang Garden, Shi  
Jiayuan Road, Qixing  
District, Guilin,  
Guangxi, China



Style Favorite: 9  
Comfort level: 8  
Color Favorite: 8  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

Name: Nisara  
Nuamsungnoen  
Height: 158cm  
Weight: 43kg  
Age: 21  
Phone: 0982684724  
Address: House No. 4,  
Soi Thoet Thai 81,  
Thoet Thai Road, Bang  
Wa Subdistrict, Phasi  
Charoen District,  
Bangkok 10160



Style Favorite: 9  
Comfort level: 8.7  
Favorite Color: 9  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

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Name: Wirakarn  
Kamintorn  
Height: 163.5cm  
Weight: 48kg  
Age: 21  
Phone: 0806016991  
Address: 36 38 Soi  
Chan 31, Thung Wat  
Don Subdistrict, Sathorn  
District, Bangkok 10120



Style Favorite: 9.2  
Comfort level: 8.3  
Favorite Color: 8.5  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

Name: Chen Le  
Height: 163cm  
Weight: 51.5kg  
Age: 23  
Tel: 18808232834  
Family Address: No. 56,  
Guanghua Street,  
Qingyang District,  
Chengdu, Sichuan  
Province, China



Style Favorite: 9  
Comfort level: 8.5  
Color Favorite: 9  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

Name: Jena  
Height: 158cm  
Weight: 51kg  
Phone: 0614289298  
Address: Rama 3 soi 1  
bang kho leam bangkok  
10120



Style Favorite: 8.5  
Comfort level: 8  
Favorite Color: 8.5  
Everyday wear: the  
testers found it wearable  
for daily travel and  
work.

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Name: Li Xiaomei  
Height: 167cm  
Weight: 49kg  
Age: 22  
Tel: 15909645055  
Home address:  
Yuanzhou District,  
Guyuan City, Ningxia  
Hui Autonomous  
Region



Style Favorite: 8  
Comfort level: 7.8  
Favorite Color: 7.5  
Everyday wear: the  
tester thought it could be  
worn for everyday  
travel, but would not  
wear it in a work  
environment.



## **CHAPTER 5**

### **CONCLUSION**

#### **5.1 DOCUMENTATION AND IMPACT ASSESSMENT OF THE DULONG TRADITIONAL COSTUME MODERNIZATION PROJECT**

##### **5.1.1 INTRODUCTION TO DOCUMENTATION PROCESS**

The documentation process is a critical component of the Dulong Traditional Costume Modernization Project, ensuring that the journey from conceptualization to realization is meticulously recorded. This section outlines the methods and strategies employed to document the project's progression and assess its cultural and economic impact on the Dulong community.

##### **5.1.2 DOCUMENTATION METHODS**

###### ***5.1.2.1 DIGITAL ARCHIVING***

The project leverages digital archiving techniques to create a comprehensive electronic repository of all research materials, interviews, surveys, design drafts, and final products. This includes high-resolution images, videos, and 3D models generated using CLO3D software, ensuring that all data is readily accessible and securely stored.

###### ***5.1.2.2 PHYSICAL DOCUMENTATION***

In addition to digital records, physical samples of the traditional costumes, both original and modernized versions, are preserved in a dedicated archive. These samples serve as tangible evidence of the project's outcomes and the evolution of Dulong traditional attire.

###### ***5.1.2.3 NARRATIVE REPORTING***

Detailed narrative reports are compiled at various stages of the project, providing a chronological account of activities, decisions made, challenges encountered, and solutions implemented. These reports offer an in-depth look at the project's progression and serve as a reference for future endeavors in cultural preservation and innovation.

### **5.1.3 ASSESSING CULTURAL IMPACT**

#### ***5.1.3.1 QUALITATIVE ANALYSIS***

Cultural impact is assessed through qualitative analysis of interviews and community feedback. The focus is on the perception of Dulong traditional costumes within the community and how the modernization project has influenced their cultural identity and heritage appreciation.

#### ***5.1.3.2 QUANTITATIVE SURVEYS***

Quantitative surveys are conducted to measure changes in cultural engagement and participation. The surveys evaluate the frequency of traditional costume wear, participation in cultural events, and the level of interest in Dulong cultural practices before and after the project's implementation.

#### ***5.1.3.3 CULTURAL PRESERVATION METRICS***

The project employs cultural preservation metrics to evaluate the success of modernization efforts in preserving traditional elements. This includes the retention of traditional weaving techniques, color schemes, and motifs in the modernized costume designs.

### **5.1.4 ECONOMIC IMPACT ASSESSMENT**

#### ***5.1.4.1 MARKET ANALYSIS***

Economic impact is gauged through market analysis, examining the demand for modernized Dulong traditional costumes within the local community and potential export markets. Sales data, customer feedback, and market trends are analyzed to assess the economic viability of the project.

#### ***5.1.4.2 EMPLOYMENT AND INCOME GENERATION***

The project's impact on employment and income generation within the Dulong community is measured by tracking job creation, increased income levels, and the development of new skills related to costume production and sales.

#### ***5.1.4.3 ECONOMIC SUSTAINABILITY***

Assessing the long-term economic sustainability of the modernized costumes involves evaluating the cost of production, pricing strategies, and the development of a market-driven business model that supports the Dulong community's economic growth.

## **5.1.5 INTEGRATION OF INNOVATIONS**

### ***5.1.5.1 TECHNOLOGICAL INTEGRATION***

The documentation process also captures the integration of new technologies, such as 3D virtual modeling and digital textile printing, and their impact on the production process, cost-efficiency, and design innovation.

### ***5.1.5.2 DESIGN INNOVATION ASSESSMENT***

The assessment of design innovation focuses on how the modernized costumes have been received in terms of aesthetic appeal, functionality, and cultural authenticity. This is evaluated through consumer satisfaction surveys and expert reviews.

The documentation and impact assessment process is vital for understanding the holistic impact of the Dulong Traditional Costume Modernization Project. By thoroughly recording the project's journey and systematically evaluating its cultural and economic effects, the research not only contributes to the field of cultural preservation but also provides a robust framework for future projects aiming to reconcile tradition with modernity.

## **5.2 ANALYSIS OF THE RESEARCH RESULTS**

The author graduated from Yunnan University of Nationalities in China. Before this study began, the author came into contact with the Dulong ethnic group and learned about the traditional culture and costumes of the Dulong ethnic group during her undergraduate studies. She had the most basic knowledge of the development of the Dulong ethnic group's traditional costume culture and its background. With this foundation and background, the author further understood the Dulong ethnic group's traditional costume culture and research. In this paper, the first question is how to minimize or even prevent the gradual disappearance of Dulong traditional culture through the current situation of the development of Dulong traditional dress culture, and the second question is how to let the disappearing Dulong traditional dress culture return to the Dulong ethnic group and modern society. Based on the questions raised, the author has carried out an in-depth discussion on the traditional culture and costumes of the Dulong ethnic group. Firstly, by analyzing and comparing the studies on the costumes of 25 ethnic minorities in Yunnan Province, the author has proved the uniqueness of the traditional costumes of the Dulong ethnic group. Based on a literature survey, case analysis, interviews, and questionnaires, the author determines the main research object of the fourth chapter: the material technology, color distribution, and structural style of Dulong traditional costumes, and discovers that the functions of the structural style of Dulong traditional costumes cannot satisfy the people's normal daily life, travel, and work. In addition to being inconvenient to wear

daily, the Dulong traditional costumes do not conform to the human body shape. The lagging development of Dulong traditional costumes is one of the main reasons why the Dulong people have given up wearing their own costumes. Aiming at the main defects of Dulong traditional costumes, the author collected and analyzed the main structure and wearing characteristics of Dulong traditional costumes through literature and pictures. According to the characteristics of the structure and wearing forms of Dulong traditional costumes, the author combined the clothing design elements that are applied more in modern society nowadays, such as pleated elements, folded elements, and shrinking elements, and set up the experiments of vertical tailoring. The author innovatively designed 27 clothing styles with the structural characteristics of Dulong traditional clothing. On this basis, the author studied the ergonomics theory and used the CLO3D clothing drawing software. Through the clothing human structure factor analysis and the results of the questionnaire survey on the Dulong women, the author used the CLO3D software to carry out the steps of clothing pattern drawing, fabric cutting, sewing, and model drawing. The author set up four human body dynamic evaluation poses, utilized the pressure test in CLO3D to evaluate the pressure of nine stand-up clothing styles, and finally chose the three sets with the best evaluation results to be sewn into garments.

### **5.2.1 THESIS FOCUS AND INNOVATION**

This article focuses on a detailed description of the changes and development of the traditional clothing culture of the Dulong people. The author uses pictures and texts to show the evolution of the Dulong clothing craftsmanship, color, structure and wearing style in the social process. The different wearing styles of the Dulong traditional clothing in different eras, different groups and different age backgrounds. Finally, the author sorted out three wearing styles. The development of the Dulong traditional clothing not only reflects the living conditions of the ethnic group in different eras, but also shows its rich cultural heritage.

(1) The innovation point is to set up a standing cutting experiment based on the structural characteristics and wearing form characteristics of the Dulong traditional clothing combined with various techniques in current clothing design. The standing cutting experiment obtained 27 style experimental results, achieving the second purpose of this study, that is, to make the Dulong clothing structure and style adapt to the aesthetics of modern society.

(2) The author used CLO3D to make digital virtual fitting for 9 of the 27 clothing styles. The results of this study not only solved the innovation of the traditional clothing styles of the Dulong people to adapt to modern aesthetics, but also successfully used CLO3D software to make digital virtual fitting effects, achieving the purpose of detecting whether the clothing conforms to different human body dynamics. Under the concept of saving, environmental protection and sustainable

development, the third purpose of this study was achieved, that is, the innovation of the traditional clothing styles of the Dulong people conforms to the human body and can meet the various human body dynamics in daily life and work.

(3) It is an arduous and long road to let the traditional clothing of the Dulong people return. The characteristics of the traditional clothing of the Dulong people sorted out in this study will help the Dulong people to improve their national cultural identity, reduce and prevent the speed of the demise of the traditional clothing and culture of the Dulong people. In addition to improving the national identity of the Dulong people, it also requires the attention of social groups, scholars and designers, so that the return and development of the traditional clothing culture of the Dulong people can keep pace with the times, and use new fields and new disciplines of knowledge and virtual digital software to help the Dulong people solve major clothing culture problems. The traditional clothing elements of the Dulong people have been reinterpreted and applied in a new way, which not only retains the essence of tradition, but also incorporates the innovative concept of modern design, forming a unique modern ethnic costume, and achieving the first purpose of this study, that is, to prevent the extinction of the traditional clothing culture of the Dulong people. The research results of this paper not only provide theoretical support for the innovation of Dulong clothing, but also provide valuable experience and inspiration for the modernization and improvement of other ethnic costumes.

In the context of globalization, the innovation of ethnic costumes is not only the inheritance of culture, but also the exchange and integration of culture. Ethnic elements are highly sought after in modern design. Designers are often able to combine Chinese and foreign cultures, and innovate on this basis to open up new fashion trends. Through these innovative designs, this paper not only shows the unique charm of Dulong traditional costumes, but also provides new ideas and methods for the modernization and innovation of ethnic costumes. The innovation of Dulong clothing is not only the inheritance and development of traditional culture, but also reflects the integration and innovation of modern design concepts. By combining tradition and modernity, this paper explores the application of Dulong clothing in contemporary fashion and shows how to give new vitality to traditional clothing through design. Further improvement directions in functionality and fashion are proposed in the future.

### **5.3 INSUFFICIENT RESEARCH FOR THESIS**

This time, the author based on the only available literature and graphic materials, network data, field evidence, and shooting information to analyze the structure of the Dulong traditional clothing and the division of the Dulong traditional clothing wearing styles. During the research and analysis of the structure of the Dulong traditional clothing and wearing styles, the author did not promptly consult with



experts in the field of national costumes. This may result in some scholars and experts not recognizing the three types of traditional costumes of the Dulong ethnic group compiled by the author.

The target population of this study is 18-25-year-old Dulong women, and the most important aspect to consider in the design and production of clothing is the proportion and size of the human body. In this study, the author only conducted a questionnaire survey, and the figure of the Dulong women was only represented by calculating the average height and weight. No on-site measurements of height, weight, and three-dimensional measurements for Dulong women between the ages of 18-25 were conducted. Consequently, the clothing designed in this study may only be suitable for some Dulong women.

The structure of Dulong traditional clothing is a “one-piece” structure. Measuring the “one-piece” structure clothing style and the design of Dulong striped color patterns presents a significant challenge. Following this research, future studies can adopt different colors and patterns on the front and back of the fabrics to innovate the design of Dulong traditional clothing with a “one-piece” structure.

#### **5.4 DISCUSSION**

As explored in this study, the modernization and innovation of the Dulong traditional costumes are not an isolated endeavor but part of a broader global trend in which ethnic groups are revisiting and revitalizing their traditional attire. This discussion section compares the Dulong’s efforts with those of other ethnic groups undergoing similar transformations. The purpose is to identify common patterns, share successful strategies, and anticipate potential challenges that may arise from such modernization processes.

This study could be further discussed in the way of comparative analysis:

(1) Global Context of Ethnic Costume Modernization: The modernization of ethnic costumes is a phenomenon observed across various cultures worldwide. For instance, the Maasai of Kenya and the Native American tribes have successfully integrated elements of their traditional attire into contemporary fashion. A comparative analysis reveals that successful modernization often involves a deep understanding of the cultural significance of the attire, combined with innovative design that appeals to modern sensibilities.

(2) Cultural Preservation vs. Commercialization: Many ethnic groups face the critical challenge of balancing the preservation of cultural authenticity with the commercial potential of their traditional costumes. The comparative study shows that groups that have maintained a strong focus on cultural education and community involvement, such as the Sami people of Scandinavia, have managed to preserve their traditional costumes while also exploring commercial opportunities.

(3) Innovation in Design and Material: Modern materials and design techniques have been key factors in successfully modernizing ethnic costumes. For example, the incorporation of sustainable and locally sourced materials by the Andean weavers of South America has allowed them to create contemporary designs that are both environmentally friendly and culturally relevant.

(4) Community Involvement and Empowerment: The role of community involvement in the modernization process cannot be overstated. The comparative analysis highlights that when communities are actively involved in the design and decision-making processes, as seen with the revitalization of traditional Hawaiian garments, the outcomes are more likely to be embraced by the community and respected by outsiders.

(5) Role of Technology in Modernization: Technology plays a significant role in modernizing ethnic costumes. The use of digital platforms for design, like the CLO3D software utilized in this study, and for marketing and sales has been instrumental in bringing traditional attire to a global audience. The case of the Indian saree, which has been adapted into various modern styles and marketed online, exemplifies the power of technology in reviving traditional fashion.

(6) Challenges in Maintaining Traditional Craftsmanship: While modernization offers numerous opportunities, it also challenges the maintenance of traditional craftsmanship. The comparative study reveals that efforts to preserve traditional skills, such as the Japanese Kimono industry's focus on preserving weaving and dyeing techniques, are crucial to ensure that modernization does not lead to losing these invaluable skills.

(7) Economic Implications of Modernization: The economic impact of modernizing traditional costumes is multifaceted. For some ethnic groups, such as the Tibetan weavers, modernization has opened up new markets and income sources. However, it also poses the risk of exploitation and the loss of cultural ownership. A careful and ethical approach to modernization must ensure that economic benefits are equitably distributed within the community.

(8) Sustainability and Environmental Considerations: Sustainability is a key consideration in modernizing traditional costumes. Ethnic groups like the Inuit, which have a history of using sustainable materials, have been able to adapt their traditional practices to create modern attire that is both eco-friendly and culturally significant.

(9) Cultural Exchange and Identity: Modernizing traditional costumes facilitates cultural exchange and can strengthen an ethnic group's identity. However, it is essential to ensure that this exchange is respectful and does not lead to cultural appropriation. The comparative analysis shows that groups that have been proactive in defining and controlling the narrative around their traditional attire have been more successful in maintaining their cultural identity.

## 5.5 PROSPECTS FOR THE DEVELOPMENT OF THE THESIS RESEARCH

(1) According to the author's research, in the future, the author himself or other scholars and designers can use their knowledge of clothing structure and design to make further additions and improvements to the structure of Dulong traditional costumes and their wearing styles. This will help the Dulong people enhance their sense of identity with their national costume culture in the foreseeable future.

(2) After understanding the characteristics of the Dulong traditional clothing structure, the Dulong people can learn clothing construction and pattern making. They can innovate various styles using vertical cutting combined with modern clothing techniques such as pleating, folding, shrinking, and skeletonization. This will allow the Dulong people to expand beyond just weaving and selling cloth. They can use their woven cloth to create garments with traditional Dulong structural characteristics, allowing the Dulong people and those interested in national cultural development to witness the return of the disappearance of Dulong traditional attire.

(3) With the support of government policies and enterprises, a dedicated database for Dulong traditional clothing style innovation can be established. Relevant personnel can submit new clothing designs to the database. College students learning CLO3D clothing software can create digital virtual try-ons and conduct pressure tests for the clothing styles in the database. Before making innovative traditional clothing, the Dulong people can refer to the database to view and select virtual wearing effects. This aims to save fabric costs and the time costs of weaving and sewing. Given the high time cost of hand-weaving cloth, blindly creating new clothing styles without virtual testing could lead to unsatisfactory results and potential losses, which are best avoided for the economically disadvantaged Dulong community.

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