

The Transformation of Taiwanese Shadow Puppet Images and Its Application to Zero-waste Fashion Clothing

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Abstract—Because of the eco sustainable problems, the fashion waste has become an important issue. How could people reduce the waste in the production process, and deal with clothing that thrown away? With the promotion and development of cultural and creative industry, most of people just apply those culture images to works but ignore the concept of eco-friendly and marketability.

This study is about traditional shadow puppet images applied with zero-waste patterns, and provides an environmentally conscious with both traditional culture and trendy fashion designs.

Keywords: *eco sustainable, shadow puppet, zero-waste fashion, clothing pattern*

I. INTRODUCTION

In *Culture is a Good Business*, Feng Jiuling writes: "Culture is the best value-generating capital. Landscape, garden, architecture, religion, folk custom, history, cooking, wine, tea or various artistic and cultural assets all contain important wisdom and skills handed down from a nation for thousands of years, which will bring rich inspiration and materials for large and small industries and cultural tourism."

The shadow puppetry in Taiwan originated in mainland China and spread across southern Taiwan as immigrants moved in. Before the rise of television in the 1960s, shadow puppetry was a favorite pastime in the early agricultural society, with its unique techniques of sculpting puppets and lighting projection. However, the few remaining shadow puppetry troupes in Taiwan are located in Kaohsiung, which is also a precious asset of traditional art and culture. Since the industrial revolution, the use of fossil fuels and large-scale exploitation of the earth's energy resources have led to a sharp increase in carbon dioxide concentration and temperature. Scholars predict that by the end of the 21st century, carbon dioxide levels will be two to three times what they were during the industrial revolution. The earth's temperature would then rise by 5.8 degrees, melting icebergs and raising sea levels by about 88cm. This has led to inundation of islands, reduced agricultural production, climate change, more tropical malaria infection and destruction of the earth's ecosystems. (Zhang Hongwu, 2005)

The garment industry wastes thousands of tons of material each year, and apparel professionals say that about 15 to 21 percent of the fabric used to make clothing ends up in landfills — because it's cheaper to throw it away than to recycle it. Nowadays, with the development of fast fashion brands, clothes are becoming more affordable, and consumers can buy more clothes at the same price. This also means that wasted materials are also increasing, so fashion waste has become a problem that cannot be ignored.

Modern consumers are more aware of their own needs. They want to get more value from consumption than product functions. They also have a higher awareness of environmental protection and pay more attention to connotation and depth. (Feng Jiuling, 2002) This paper aims to explore the cultural images and characteristics of existing shadow puppetry in Kaohsiung on the basis of understanding its traditions, and to transform its elements into creative applications of contemporary fashion design. The zero-waste layout structure advocated by Eco chic is also used as a reference for the fashion design that gives consideration to the fashion culture style and the concept of environmental protection.

II. LITERATURE REVIEW

A. *An overview of shadow puppetry*

Shadow puppetry is a folk dramatic art in which a story is performed by the act of silhouette, with light shining on the skin of a shaved cow. Together with puppet show and glove puppetry, they are called three major puppet plays.

Scholars have different opinions on the origin of Chinese shadow puppetry, including outside theories. However, most scholars agree that shadow puppetry should originate from China. Up to now, Qiu Yifeng mentioned in his book *Taiwanese Shadow Puppetry* that the origin of shadow puppetry can be roughly divided into four types: "Zhou Dynasty", "Han Dynasty", "Tang and the Five Dynasties" and "Song Dynasty". Many of the claims that have been widely cited and talked about in literature mainly come from the record of volume nine *Shadow Play of Oriental Forum* written by Gao Cheng in the Song Dynasty. It says that

during the reign of Emperor Wu Di of the Han Dynasty, the necromancer Li Shaoweng said that he would conjure up spirits and set up a tent to make shadows to find the ghost of his concubines, madam Li. But in fact, it was the necromancer who "light the candle at night and set the curtain", "ordered the workers to carve the shape of the concubine according to picture", "placed it in the screen", "asked the emperor to stand in other places and look at it from a distance". Since this narrative is the same as the equipment and methods required for shadow puppetry today, many scholars point to this as the origin of shadow puppetry in later generations. According to the notes of many Song people, the development of shadow puppetry was mature in the Song Dynasty, and there were already shadow puppetry guild organizations and industries specialized in carving puppets.

In the Yuan Dynasty, the shadow puppetry was used as an entertainment for the army, and spread to the Middle East, the Near East, and Egypt with the Mongolian army's expedition. Therefore, Yuan Dynasty can be regarded as the propagation period of shadow puppetry. (Chen Yisu, 1992) By the Qing Dynasty, shadow puppetry shows had spread widely and developed many genres. Although there are different accounts of shadow puppetry in Taiwan, it happens that most of them point to the same geographical area — Kaohsiung. (Qiu Yifeng, 2003)

B. The content and style of shadow puppetry performance

The content of shadow puppetry performance is mentioned in Wang Haixia's *China's Most Beautiful: Shadow Puppets*: "The essence of shadow puppetry is to preach and educate, and the education of shadow puppetry in music has played the most useful role in promoting justice and punishing evil."

In addition to performers, shadow puppetry requires a stage, window, lighting and puppets. In the past, the stage of shadow puppetry was very simple. Since shadow puppetry is a sideline for peasants in their spare time, it is mostly based on local materials: ox carts are simple and convenient stages. "Shadow window" refers to the white curtain in front of the stage during a performance. Without light, there would be no shadow, so "light" is an important part of the life of shadow puppets. (Qiu Yifeng, 2003)

According to the description of puppet appearance by scholar Lv Shengzhong (2003), the characteristics of puppet are as follows:

- The exterior outline is emphasized and the interior decoration varies according to the overall image.
- The composition is treated as planar to avoid overlapping between different shapes.
- Modeling language is full of procedure and decoration, using specific images to express the intangible or unstable image.
- The concise symbolic symbols are used to express the connotation.

Most of the traditional puppets are images of figures of the times or fairy tales. They are made of cow hind and painted in red, green and black. The shadow puppets of the eight immortals crossing the sea in the Qing Dynasty collected in the National Art Museum of China, present the clouds in a figurative way. In addition to the original yellow leather, the colors are mostly red, green and black in different shades.

C. Zero waste clothing

A piece of cloth is processed, bleached, dyed into yarn, fabric, and later made into garments for use. It is eventually recycled and even incinerated, with carbon emissions at every stage. In the face of environmental crisis and environmental needs, what can fashion designers do? About 15% of the fabric is wasted in fabric cutting, and if the designer can pay attention to the material while taking into account the wasted part in the design, the wasted part can be utilized to the full, which will not only add value but also reduce waste. (Chen Xiaosui, 2012) Historically, zero-waste clothing is not uncommon. Fashion designer Ada Zandoni once said: "The rational use of the whole cloth is not a new phenomenon. This concept has long been used in the manufacture of Japanese Kimono and India Sari to avoid wasting precious materials. But the industrialization of fashion, coupled with the emergence of mass-produced fast fashion, has made the concept fade away." As a Chinese, the Han clothing worn by ancestors was also cut on a flat surface. Others, such as wartime rationing, forced the people to make full use of their limited rations. In addition, the traditional weaving technology is also a positive realization of zero waste.

Timo Rissanen, an assistant professor in the Department of Fashion Design and Sustainability at *Parsons School of Design*, studied a group of designers between the 19th and 20th centuries and discovered the bias cut, invented by Madeleine Vionnet, which uses the drape of fabric twill to fit the body, increasing the feasibility of zero-waste clothing. In the entry kit to the zero waste fashion competition *ECO CHIC*, she notes: Be sure to use jigsaw puzzles to imagine how to make rational use of the whole cloth, or use draping technology to put textile materials on the human model for design. (See "Fig. 1")

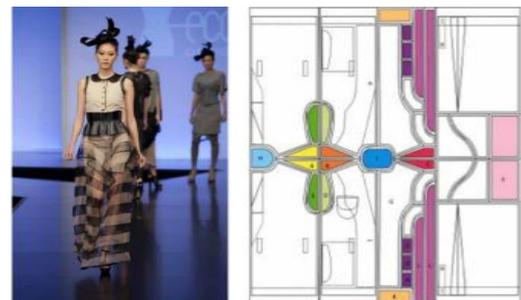


Fig. 1. Winsome Lok uses jigsaw patterns to imagine how to use the entire fabric to create her zero-waste clothes.

Zero-waste fashion designer Daniel Silverstein also gives advice to new designers who want to pursue this field: "The secret to zero waste design is this: work backwards and the result must be a square."

III. RELEVANT PRODUCT DESIGN CASE ANALYSIS

Through literature review, this study finds out the direction to explore, and uses literature analysis to collect relevant design works, discusses the works with light and shadow characteristics, the works combining shadow puppetry images with popular fashion, and takes its characteristics as a reference for subsequent costume design.

A. Case study of products created with light and shadow characteristics

IQ Light, designed by Danish designer Holger Strøm, can be a cloud, a flower, or a moon. It consists of plastic sheets that overlap with each other using a special structure similar to tenon, creating many effects through light. Later, some designers also took this as inspiration to create *Puzzle Lights*, which is full of changes. Based on these characteristics, they used overlapping techniques of transparent materials to bring out the fun of clothes through light.



Fig. 2. IQ Light.



Fig. 3. Puzzle Lights.

B. Case study on the application of shadow puppetry culture to costume

In recent years, the fashion industry has also set off a national tide. The more local, the more fashionable they are. Therefore, elements belonging to Chinese culture have become a trend, and many brands have entered the international market under the concept of "Chinese style".

1) *Shiatzy Chen*: *Shiatzy Chen*'s 2011 spring/summer collection "Shadow", inspired by interplay of light and shadow in shadow puppetry, use translucent colors to complement the installation's distinctive geometric contours and multi-level tailoring. The collection captures the essence of eastern and western art, celebrating the diversity of cultures and presenting a visual feast that transcends time, place and beauty. (See "Fig. 4")



Fig. 4. *Shiatzy Chen*'s 2011 spring/summer collection.

2) *Bblluuuee*: Chinese brand *Bblluuuee* insists on blending Oriental aesthetic on intellectual and elegant style. The brand's autumn/winter clothing collection "Pick up the Light. Dream in the Garden" released in 2015 *Shenzhen Fashion Week* was inspired by Chinese folk art shadow puppetry, and applied the figure elements of shadow puppetry to the clothing with the help of technology. For example, shadow puppetry figures are printed on translucent cloth and stacked so that people can move around in a dynamic way, using flocking printing technology to present paper-cut images, bringing the magnificence of shadow puppets into the thin transparent yarn, or the shadow puppetry image is transformed into a lace design and stacked to present the "noise" of shadow puppetry, and the sound is transformed into clothes. The traditional shadow puppetry puppet is decomposed and stitched into the costume, so that a costume can become a drama, as shown in "Fig. 5".



Fig. 5. *Bblluuuee*'s 2015 spring/summer collection.

C. Case study of zero-waste garment structure

The designer *Ada Zanditon* aims at zero waste. He is good at creating layers and combinations of various textures. Inspired by origami, he uses complete square fabrics of different sizes to conceive the ideal outline, and then directly tries out details in the way of vertical cutting to create interesting and attractive clothes.



Fig. 6. Portfolio of Ada Zanditon.

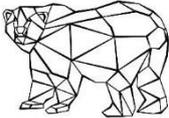
the creative examples of fashion designers, this paper has a deeper understanding of the concretization and image of element transformation, and also conceiving the patterning skills while designing styles, so as to urge the authors to think deeply about element transformation and zero-waste clothing and deepen the understanding of relevant creators on zero-waste concept.

The characteristics of shadow puppetry, such as "adjusting the external contour and changing the interior decoration according to the overall image", can be transformed into graphic design elements for various issues, and integrated into the design of environmental protection issues. The polar bear and leaf vein can be transformed into shadow puppet-like printing design as "Table I".

IV. TRANSFORMING SHADOW PUPPETS INTO FASHION DESIGN ELEMENTS

This paper intends to apply the cultural elements of shadow puppetry to the popular clothing, and at the same time take into account the concept of zero waste. Based on

TABLE I. CONVERTING SHADOW PUPPETS INTO PRINT ELEMENTS

Element	Convert the style of puppet	Design specification
		The concept of geometric combination is used to transform the polar bear's three-dimensional appearance into a planar contour.
		Removing the original color of the leaves and strengthen the existing lines of the veins to reinforce the style of shadow puppet.
		Cloud is an important supporting role in shadow puppets. It is a feature of shadow puppetry to present the non-figurative objects with lines.

V. APPLICATION OF SHADOW PUPPETS IN ZERO WASTE VERSION OF THE POPULAR CLOTHING DESIGN

Based on the existing literature and analysis, the authors find out the characteristics of shadow puppets and the techniques of zero-waste costume pattern design, and then by analyzing the interpretations of different designers on lighting, shadow puppetry and zero-waste fashion, obtain inspiration from them. In general, zero-waste costume design mostly emphasizes structure and uses less pattern design. In this study, 2D images and 3D zero-waste edition are combined to create zero-waste costume that shows the cultural style of shadow puppetry and conforms to the contemporary trend.

The designed image is used as a unit to rearrange in the garment, and the yarn woven by different color is used to

show different colors through light and shadow. When designing the outline of the style, the processing of the plane type is brought into the thinking of the pattern, and the three-dimensional shape is expected, so that the clothing can be composed of a complete square type of cloth, achieving zero waste and innovative design goals with cultural connotation, such as "Fig. 7".



Fig. 7. The application of shadow puppets in the zero waste version of the popular clothing design series.

VI. CONCLUSION

The environmental damage caused by fast fashion has become unbearable. Many clothing brands have incorporated sustainable development into their business strategies, and proposed many recycling schemes to make waste products into new products. However, among these discarded fabrics, about 15% to 21% of the scraps are leftover materials that have been left behind during the manufacturing process and have consumed a lot of resources, but have been discarded before entering the life course of clothing. In this study, the goal of environmental protection and fashion was realized with the zero-waste pattern structure, and the fabric was completely applied to the production of clothing, which not only reduced the production of textile waste, but also made more rational use of the resources consumed in the process of fabric production. In addition, the global warming issue is combined with the characteristics of Chinese culture, and the zero-waste clothing structure is designed to create a new fashion style, bringing social issue-oriented design thinking to the fashion industry.

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