

Innovative Application and Design of Smocking Technology in Local Chinese Clothing Brands

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Abstract

This study explores the innovative application and design of smocking technology in local Chinese clothing brands, emphasizing the technique's evolution from a functional necessity to a decorative art form. It delves into the integration of smocking with modern fashion design, highlighting its significance in enhancing fabric texture, silhouette, and overall aesthetic appeal. Through comprehensive analyses of case studies and craft types, the paper reveals how local brands creatively adapt smocking, merging traditional craftsmanship with contemporary design principles. The findings suggest that smocking technology not only enriches the textile design repertoire but also contributes to the global identity and innovation of local Chinese clothing brands, bridging heritage crafts with modern design innovations.

Keywords

Smocking technology and techniques, local brands, innovation of inheritance.

1. Introduction

Smocking originated in the United Kingdom and is a pleating process of farmers' working clothes. In China, smocking technology is called pleat embroidery, cable tying, three-dimensional embroidery of fabrics, pleats, etc. [1]. These diverse names lead to an unclear division and definition of the smocking craft in domestic literature, which is very inconvenient in the process of document retrieval; but, in fact, the smocking craft is one of the 'pleat' crafts of clothing fabrics and is a method of texture modification.

In the process of clothing development, people have changed from being satisfied with the function of clothing as a cover to the pursuit of spiritual enjoyment, and the role of clothing is constantly improving. Since the 1980s, with the increasing emphasis on fabric design, research on the texture of clothing materials has gradually become the focus of brand exploration [2], so as to continuously explore the innovation and changes in clothing fabrics. As a re-design technique for fabrics, smocking technology can be fully exploited to help enhance the originality of clothing design in material innovation, so that consumers can experience design ideas and artistic

connotations from the texture of clothing materials, and enjoy the artistic influence brought by clothing, which is in line with contemporary people's enjoyment and pursuit of the spiritual realm.

This paper takes smocking technology as the research object, summarizes clothing cases and craft types of the use of smocking technology in local clothing brands, analyzes the innovative application of smocking technology, and thus discovers the diversification and practical application of smocking in local clothing brands. Based on the application and practice of smocking craft research, it aims to verify the feasibility of the above theoretical research through practice, to provide a broader development idea for new brands, and to better promote the development of traditional handicrafts and local clothing brands.

2. Current Research Status

2.1. Domestic and international literature research status

Domestic and international research on smocking craft mainly discusses the pleat structure, as well as the principle,

craftsmanship, and the integration of new technologies. For example, the impact of the history and production methods of pleating techniques on garment structural design has been explored [3] (Li, 2023). The principles behind the formation of pleats through reduction, addition, and accumulation have been analyzed, as well as their extended application in design through real case studies, applying pleating to dresses and the collars, shoulders, and chests of tops [4]. Starting from the flat structure of women's skirt pleats, the source of pleats, types of pleats, and their adaptability to design locations were discussed, along with the craftsmanship and fabric characteristics, to refine the implementation elements of pleating in women's skirts, providing guidance for the perfect presentation of pleats [5]. The importance of three-dimensional pleating design methods in the garment design process was demonstrated, with computer animation technology applied in the design process of three-dimensional pleated garment patterns. Based on the method of geometric pleat analysis, the design and three-dimensional analysis of pleated patterns were achieved, realizing the goal of three-dimensional pleated garments [6].

Despite the widespread discussion of pleat application in garment design,

from enhancing the aesthetics of the fabric and improving garment structure design, to introducing advanced technology to improve design precision, those studies have provided a rich knowledge base and inspiration for the field of garment design. However, how to closely integrate these technologies with the development of local clothing brands, especially in finding a balance between traditional craftsmanship and modern design innovation, remains an area for exploration. This paper aims to fill this gap by deeply analyzing the smocking craft, a traditional handicraft with potential innovative capabilities, to explore its practical application in local brands and its new value and possibilities in contemporary garment design. It seeks to promote the innovative development of the smocking craft from both theoretical and practical perspectives, injecting new vitality and inspiration into local clothing brands.

2.2. The status quo of local clothing design in China

As one of the birthplaces of world civilization, China has thousands of years of history and culture. It is not only an 'exclusive' inspiration library for Chinese designers, but it also gives local Chinese fashion design brands the confidence to step overseas. A rapid change in the national clothing style occurred after the reform and opening up, and the development of modern clothing started late compared with developed countries. Since the 1990s, domestic designers have gradually paid attention to the importance of the continuity of Chinese clothing culture, rather than blindly follow international fashion.

When local brands, including JNBY, Bosideng, LiNing China, Shangguan Zhe, XanderZhou and Chinese designers expand into overseas markets and successively appear in the four major international fashion weeks, local brand clothing in China has become the vane of globalization and calls for strong purchasing power. While completing the transformation from a brand to a group, the Chinese brand ICICLE provides

Chinese consumers with more desirable fashion products, uses more metaphysical carving methods to emphasize the oriental artistic conception, and integrates Chinese aesthetic conception with western fashion tailoring through modern aesthetics. The autumn and winter Dunhuang series of DAZZLE 2021 transforms oriental aesthetics into a design style with heritage and culture, changes the old-fashioned atmosphere in the public stereotype, and has more connections with the trendy life that young people love, so that more people can understand and live in a more modern way and accept indigenous culture.

With the sudden emergence of local brands, it is not difficult to find that Chinese people's aesthetic development in local brand clothing is no longer limited to the accumulation of traditional elements and symbols, let alone the output of traditional thoughts - 'directly brought'; there is a spirit of abstraction, artistic conception and humanistic thinking. Therefore, on the basis of absorbing and learning from foreign smocking crafts, the local clothing brands in China carry out innovative designs with Chinese characteristics, combined with their own style traits, so as to create smocking crafts with Chinese characteristics in the process of integrated development and continuous innovation. In turn, domestic and foreign clothing markets can be better expanded and developed.

3. Research Methods

3.1. Literature review

In the early stages, this paper employed the literature review approach, extensively reading and collecting documents related to smocking techniques, tracing the origins and development of smocking, understanding the types of craftsmanship involved, and noting that there are few cases in the literature that combine smocking techniques with local brands from a theoretical perspective. This laid the foundation for this research and indicated the direction of the study.

3.2. Image analysis

Building on the literature review, further image analysis was conducted to systematically organize and summarize the types of smocking techniques. Through in-depth interpretation of image content, combining images with text to study the needle techniques of smocking, and meticulously examining diagrams of smocking stitches, instructions for operations, and images of finished products, this method allows for a more intuitive understanding of the characteristics of smocking needle techniques.

3.3. Case study

By extensively searching for brand cases that apply pleating, this article analyzes the specific manifestations of smocking techniques on common parts of garments, discovering that smocking not only achieves functionality that conforms to the human body's curves but also creates certain decorative effects visually. This provides inspiration and ideas for further analysis of the innovative use of smocking techniques in local brands.

4. Smocking Technology

4.1. Origin and development

The smocking process belongs to the transformation methods of clothing fabrics; that is, the pleating process is performed on flat fabric from a part or the whole. Usually, after the smocking process, the fabric can be flexibly processed in combination with the corresponding seaming method and arrangement, and the texture effect presented has a certain artistic quality, which fully reflects its decorative function.

In the early days, smocking technology paid more attention to functionality. In the 5th century, farmers' working clothes in the UK began to use smocking technology, and the originally loose and bulky shirts were tightened at the yoke and cuffs by hand-sewing, so that



(a) Czechoslovak dress



(b) 1880's-1890's young girls dress [7]

Fig.1 Early smocking clothing(photoed by web)

the farmers' limbs could move freely in the process of their work, so it is highly functional when worn. See Figure 1(a).

When it came to the Victorian era, people gradually applied this technology to young girls' clothing, and smocking technology began its decorative development of clothing. It can be seen that in the national costumes of Czechoslovakia, Hungary, Romania and other countries, smocking technology is also frequently used as a decorative craft [7], which not only retains the characteristics of the craft, but also integrates the local ethnic customs, and has a certain decorative beauty. See Figure 1(b).

In the early stage, smocking technology was mainly done by hand. In the 1880s, due to the emergence of dot transfer advertisements, the method of transferring heat transfer paper to the back of the fabric and then hiding it after sewing, production time, to a certain extent, was saved, which laid the foundation for the industrialization of smocking. In the 1950s, manufacturers Read and Amanda Jane provided pleating machines [8]. The appearance of the machine greatly liberated manual labor, making smocking technology gradually move towards the mass market, and it began to be widely used in clothing.

Like the loose shape of ancient Chinese wide sleeves, the natural folds were

caused by people's activities when wearing them, which mainly appeared in the form of hanging and wrapping natural folds [9]; but the formation did not shrink the fabric through stitching into pleats. At the beginning of the 19th century, smocking craftsmanship began to be introduced into China. In order to achieve localization, Shanghai's embroidered clothes combined Chinese and foreign traditional embroidery techniques, integrating techniques such as smocking, silk drawing, trocar and Kesi. As a result, in the 1980s, this sort of clothing developed rapidly in China [10].

4.2. Craft types of smocking in local fashion design

As smocking crafts are influenced by the introduction of culture and technology from different regions, research on needling methods presents a variety of craft types. According to different stitching methods, smocking can be divided into three types: direct smocking, kneading smocking, and combined smocking. Different types of smocking have different fabric texture effects.

4.2.1. Direct smocking

Direct smocking is also called lattice embroidery. It mainly draws grid lines on the reverse side of the fabric. The common

cycle intersection points are 2-4. The required intersection points are selected on the basis of equidistant squares to sew by hand[11]. After the thread is tightened, the fabric forms a unique pleated texture. Since direct smocking is a sewing technique based on grid points, compared with other types of smocking, the shape has a certain regularity, and the operation requires fewer skills. Table 1 presents the partial needle method of direct smocking.

In the SHUSHU TONG 2021 autumn and winter series, Chinese designers Jiang Yutong and Lei Liushu used direct smocking in the skirt, as is shown in Figure 4, which forms a strong contrast with the simple silhouette of the top, highlighting the special texture of the direct smocking process.

4.2.2. Kneading smocking

Kneading smocking is the earliest and most common. In order to modify the curve of the female body, it is often used on the chest, waist, cuffs and other parts. The kneading smocking is sewn on the front or back of the cloth by hand kneading, and the intersection point of the two layers of the fabric is selected to sew according to the pattern designed [14], so that the fabric presents an effect similar to pleat peaks, see Figure 2, and is usually used in striped and plaid fabrics. If you choose a solid color fabric, you need to sew on the basis of the marked points.

In BAN XIAOXUE 2021 spring and summer clothing, Chinese designer Ban Xiaoxue applied kneading smocking technology to the waist, as shown in Figure 5, which is both functional and decorative, enhancing the beauty of the clothing.

4.2.3. Combined smocking

Combined smocking is based on direct smocking and kneading smocking for the decoration of accessories. Smocking technology itself is a process of shaping the texture of fabrics, combined with the addition of thread embroidery, three-dimensional flowers, beads, sequins and

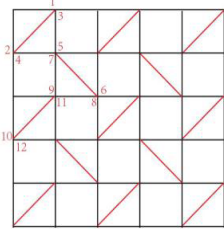
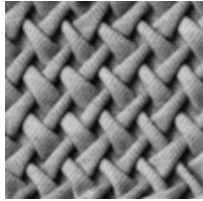
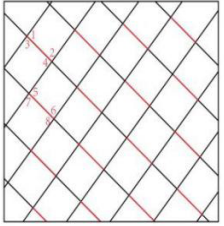
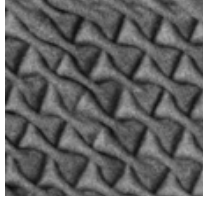
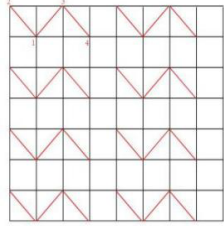
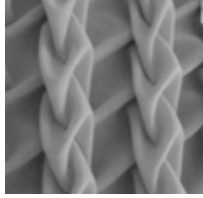
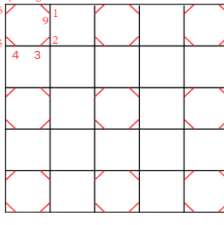
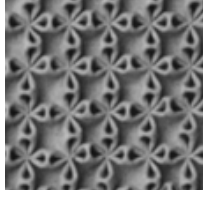
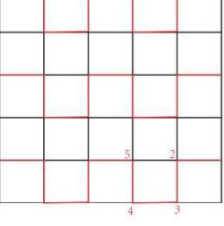
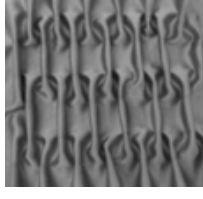
Serial number	Needle diagram	Needle operation instructions	Finished image
(1)		<p>Fix 1 and 2 diagonally with a needle, leave a distance of 0.1cm between 3 and 4 (that is, the origin of 1 and 2) for needle pricking, narrow the needle at 4, and do not tighten the transition line from 4 to 5, leaving the relative quantity of loose space. This is a unit. Repeat the above needle operation after 5. [12]</p>	
(2)		<p>Measure a distance of 0.1 cm at the repeated point, and mark it as 3, prick the needle according to the order of 1-2-3-4 in the figure, and then tighten it, and at the end , 4 places of needling ; 4 to 5 is the looseness of the transition line without tightening and leaving a relative space. Repeat the above stitches after 5. [13]</p>	
(3)		<p>Thread the needle from point 1, and sew in the order of 1-2-3-4, and finally back to 1, and the rest can be done in the same manner.</p>	
(4)		<p>Pass the thread through 1, sew according to the order of 1 to 8, leave a distance of 0.1cm between 9 and 1, tighten at 9, fix at the center point that appears after tightening, and repeat the above stitches.</p>	
(5)		<p>Pass the thread through 1, and sew according to the order of 1-2-3-4-5 in the picture, tie a knot after a row is completed, and repeat the above stitches.</p>	

Table 1. Partial needle method of direct smocking (handmade by author)

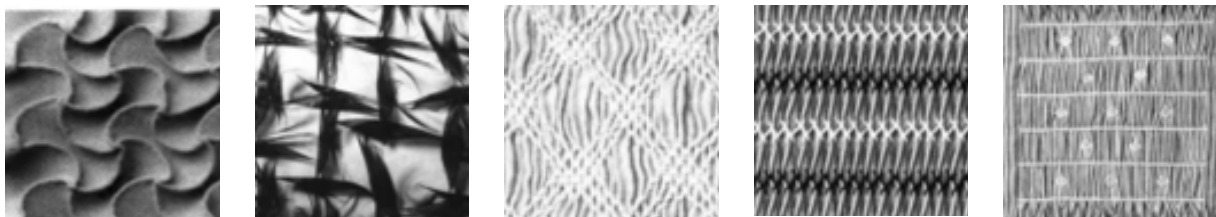


Fig. 2. Kneading smocking (photo by author)

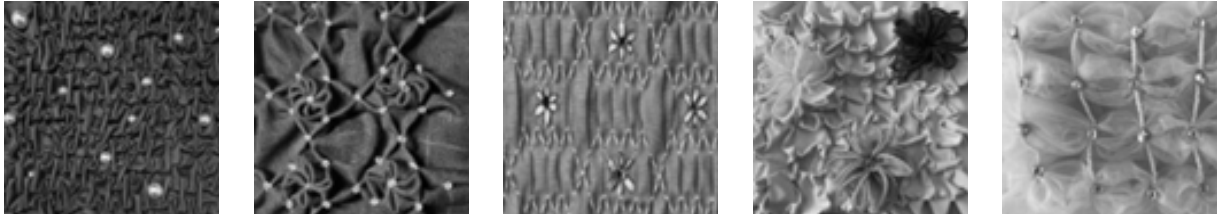


Fig. 3 Combined smocking (photoed by author)



Fig. 4 Direct smocking (from vogue)



Fig. 5 Kneading smocking (from vogue)

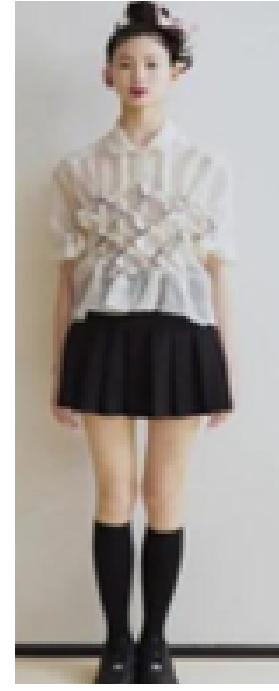


Fig. 6 Combined smocking (from vogue)

other accessories [15]. Embellishing it, see Figure 3, can make smocking more layered and richer in visual texture and tactile texture.

In the Marchen 2021 spring and summer series, Chinese designer Chen Mei added beading on the basis of direct smocking for embellishment, as is shown in Figure 6, which responds to the black skirt, demonstrating a smart girl with a little dark style and an eclectic sense of personality.

5. Application of smocking technology in the clothing design of local brands

Before the appearance of elastic fiber, in order to conform to the curve of the human body, smocking technology was often used on the chest, waist, cuffs, neckline and other parts. The shape

of the fabric can be changed through smocking technology to adapt to the radian produced by local parts, which was both functional and decorative. Since the 1950s, with the emergence of elastic fibers, in smocking technology more attention has been paid to decoration. Today, smocking craftsmanship is widely used in local brand clothing from four aspects: pattern, arrangement, fabric, and technology, mainly in the form of overall shape and partial embellishment.

5.1. Overall shaping and partial performance of smocking technology

The smocking craft usually appears in the style of trousers, skirts and tops in the overall shaping [16]. In the design of local brands, the form of smocking technology is divided into single pleat repeated application (see Figure 7) and

pleat split application (see Figure 8). Single repeated use refers to the use of the same smocking technique in the overall shaping of the clothing according to the design requirements, which has certain regularity in the visual expression effect. Split-type smocking needs to design the overall shaping of the garment in advance from the combination method and division ratio, fully considering the expression form of smocking craftsmanship in the whole garment. Clothes made by smocking technology as a whole can improve the wearer's comfort; but since smocking technology occupies a larger area, the time and difficulty of the manufacturing process will increase.

As a partial embellishment, the smocking craft often appears on the chest, waist, cuffs, collar and other parts [17] so as to fit the curve shape of the human body, and combines function and decoration.

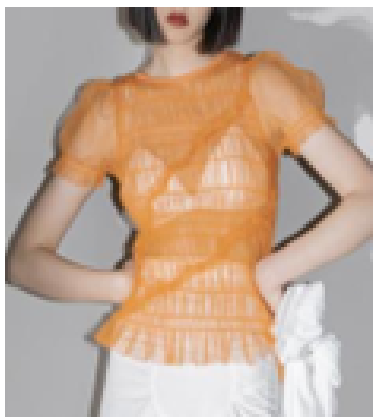


Fig. 7 Ourhour 2020 (from vogue)



Fig. 10 Urban Revivo2021 (from pinterest)



Fig. 13. ICY 2020 (from pinterest)

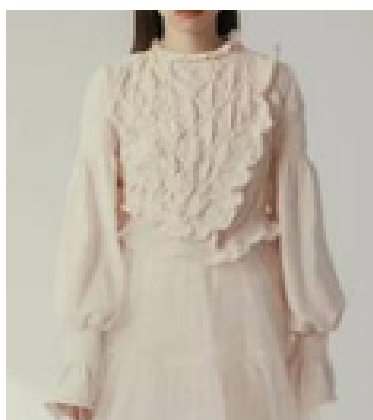


Fig. 8 BAN XIAOXUE 2021(from vogue)



Fig. 11 PSALTER 2021 (from pinterest)



Fig. 14 Marchen 2021 (from pinterest)



Fig. 9 Deplumer 2022 (from pinterest)



Fig. 12 HOPE SHOW 2020 (from pinterest)

Due to the quantity difference between the chest and waist, the chest is relatively restricted in the anatomy of the human body. As one of the key visual attention parts, the reasonable use of kneading smocking on the chest can increase the

texture of the fabric and the layering of the clothing, and show the plump breast curve of women [18], see Figure 9. As the wrist is not affected by the human

body to a large extent, applying the direct smocking process to the cuffs can achieve the purpose of tightening, which combines both the functional and decorative, as is shown in Figure 10. Applying this technology in the design of the collar can artistically embellish the neck line, see Figure 11. Hangpai women's wear brand HOPE SHOW also uses direct smocking technology on the skirts of the spring and summer of 2020 (see Figure 12) to highlight the key points of the design. In the e-commerce brand ICY2020, direct smocking technology is used on the dropped shoulders and the design modifies the shape of arms, as shown in Figure 13. Integrated smocking technology is applied to the waist to tighten it, as is shown in Figure 14, and accessories such as beads, sequins, and three-dimensional flowers are used

to decorate the smocking to broaden the contrast. According to the design needs, the space of the waist can also be designed by changing the combined structure of smocking.



Fig. 15 Ming Ma 2022 (from pinterest)

5.2. Analysis of the innovative application of smocking technology in local brands

5.2.1. Pattern innovation

When combining smocking technology with the pattern, it can make the original solid color and single fabric more vivid. The selected color fabric should be as simple as possible to balance the fabric pattern and the texture of smocking technology. In Ming Ma 2022, Chinese designer Ma Ming combined smocking craftsmanship with pink-green jacquard fabric, as is shown in Figure 15. The combination of smocking craftsmanship and ruffle design on the front chest looks sweet and lovely.

5.2.2. Innovations in permutations

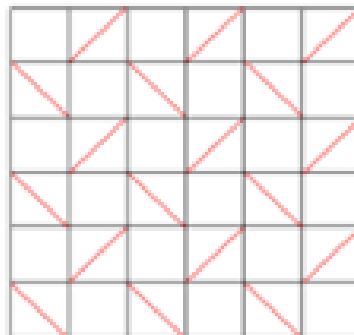
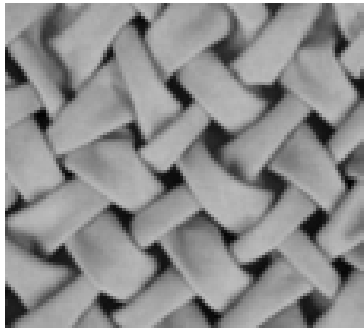
The layout and arrangement of traditional smocking crafts invariably present singularity and repetition. By changing

the order of stitches and the layout of the arrangement, smocking crafts have a more rhythmic and formal sense of expression. Different stitching methods of the same fabric design result in completely different fabric texture effects and styles [19]. The arrangement, reorganization and innovative design of the traditional smocking craft in the stitching method can obtain a richer sense of fabric texture. The innovative arrangement of stitches is shown in Figure 16.

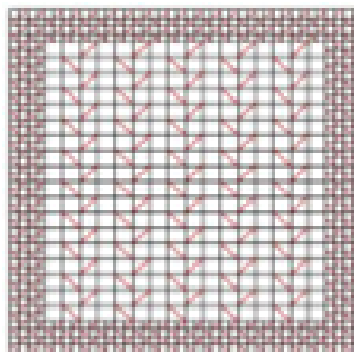
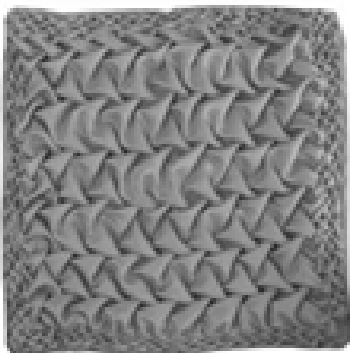
Applying color to the smocking craft, breaking through the arrangement of traditional single color, can make the effect of smocking more obvious, and the whole garment has more rhythm and sense of rhythm [20]. In the SUSAN FANG 2021 autumn and winter series, Chinese designer Fang Yannan vividly combined colored ribbons and mesh through the Smocking technique, as is shown in Figure 17.

5.2.3. Fabric innovation

Clothing design is inseparable from fabrics, and secondary design of materials through a certain process is particularly important in the garment production process [20]. Since the smocking process is to seam the fabric, soft, light and easy-to-shape cotton, linen and chiffon fabrics are more suitable for the smocking process. With the emergence of diversified fabrics in the market, the selection of fabrics in the production of the smocking process also increases. Fabrics such as leather, nomi paper, felt, and down jacket can be used as the base cloth to sew. Combining the basic stitches of smocking craftsmanship with breakthroughs in traditional materials makes the fabric presentation have a richer visual effect. In Deplumer 2021, Yang Yang, a Chinese designer, used leather fabrics to design smocking, as is shown in Figure 18, making the fabrics more three-dimensional.



(a) Traditional smocking stitch



(b) Rearrangement and combination of traditional smocking stitch

Fig. 16 Innovation of stitch arrangement (handmade by author)



Fig. 17 SUSAN FANG 2021 (from pinterest)

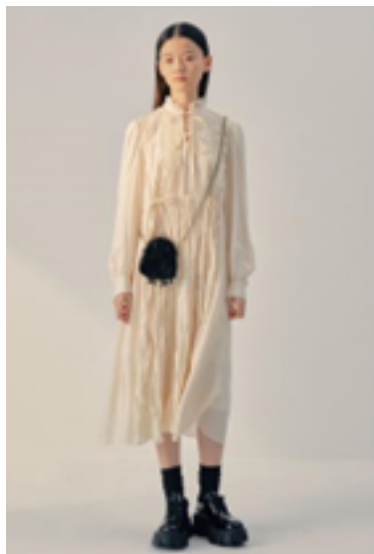


Fig. 20 BAN XIAOXUE 2021 (from pinterest)



Fig. 18 Deplumer 2021 (from pinterest)



Fig. 19 SHUSHU TONG 2021 (from pinterest)

5.2.4. Innovation of process technology

With the improvement of modern technology, the realization of smocking is not only completed by hand sewing but can also be expressed by machine weaving. The most common advanced industrial technologies, such as machine pleating, cotton filling, and knitting make the fabric appear flat and smooth combined with the principle of regular three-dimensional pleats [21]. In the SHUSHU TONG 2021 autumn and winter series, Chinese designers Jiang Yutong and Lei Liushu used machine pleating to produce a fabric texture similar to smocking, as is shown in Figure 19-20, showing the same visual effect as smocking, which combines traditional craftsmanship with modern The combination of technology makes breakthroughs in the traditional smocking form.

6. Summary

Based on the comprehensive exploration of smocking technology's application and design in local Chinese clothing brands, this paper has effectively highlighted the innovative incorporation and significant value of traditional pleating techniques in modern fashion. The analysis underscores the adaptation and transformation of smocking from a functional necessity to a decorative art

form, driven by the evolution of clothing from mere coverings to expressions of artistic and personal identity.

The integration of smocking in local Chinese brands is not merely a continuation of traditional crafts but signifies a nuanced blend of cultural heritage with modern design principles. This fusion not only preserves the essence of smocking as a textile manipulation technique but also reinvents it, offering fresh perspectives and applications in contemporary garment design. Chinese designers have adeptly utilized smocking to enhance fabric textures, create visually appealing patterns, and contribute to the silhouette and functionality of clothing, thus demonstrating a sophisticated balance between aesthetic appeal and practicality.

The research delineates various forms of smocking - direct, kneading, and combined smocking - each contributing distinct textures and visual effects to fabrics. These techniques, when applied innovatively, provide a rich tapestry of possibilities for fabric manipulation, allowing designers to experiment with form, texture, and structure in garment design. The study also showcases how local brands leverage smocking for both overall garment construction and as embellishments, catering to the evolving tastes and preferences of consumers seeking uniqueness and craftsmanship in clothing.

Furthermore, the paper articulates the importance of pattern innovation, permutations, fabric innovation, and the integration of process technology in the realm of smocking. These elements are pivotal in enhancing the dynamism and appeal of smocking in fashion design, enabling designers to explore new boundaries of creativity while adhering to the principles of sustainability and cultural integrity.

In conclusion, the innovative application and design of smocking technology in local Chinese clothing brands not only enrich the global fashion landscape but also contribute to the preservation and evolution of traditional crafts. The

strategic fusion of heritage techniques with modern aesthetics and technology paves the way for a sustainable fashion future that respects cultural roots while embracing innovation. This research underscores the potential of smocking as a catalyst for creative exploration in fabric design, urging designers to

delve deeper into traditional crafts for contemporary design solutions. The findings advocate for continued exploration and experimentation with smocking techniques, aiming to bolster the identity and global presence of local Chinese clothing brands through innovation in heritage crafts.

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