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Design and Cultural Aspects of 20th Century Chinese Xiangjin Brocade

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Abstract
As one of the representative silk-woven artworks of the 20th century in China, Chinese Xiangjin brocade, well-known as "the flower of Oriental art", draws on the essence of Sichuan brocade, Yun brocade, Song brocade, so as to form its own unique artistic style. It also takes the lead in the innovation of traditional brocade in key processes such as craftsmanship, design and jacquard, whose drawing technique is the exact core skill making it intangible cultural heritage. So far, there have been few studies on crafts and textile design in China before the 20th century or even after the reform and opening up, and rather fewer studies on the structure of Xiangjin brocade in the 20th century. This paper attempts to record and classify 1008 pieces of Xiangjin brocade in the Suzhou Silk Archive, China, as well as to find out their design features, oriental flavour, and unique weaving techniques. In addition, the cultural connotation of Xiangjin brocade as the painting medium was also put forward by analysing those brocades' historical texts, images, and style.

Keywords
Xiangjin brocade, design feature, oriental art feature, weaving technique, pattern schema.

1. Introduction

As Chinese national treasure, Xiangjin brocade and other silk products have superb weaving techniques and exquisite artistic performance. Silk reflects the characteristics of the times, as well as design features and weaving skills in different historical periods through weaving, embroidery, printing and dyeing, painting, sewing and other processes. In addition, it instilled vitality into ancient brocade arts in the 20th century. So to speak, Xiangjin brocade is not only an original craft, but also an innovation in the theme of expression, which perfectly combines aesthetics, decoration and practicality.

Xiangjin brocade is a generic term that includes portrait and landscape. This gloss silk fabric is woven by mulberry silk and rayon through the use of jacquard brocade technology with patterns of figure, landscape, calligraphy, painting, and photographic works. In the Republic of China, it was called "photographic fabric", yet in modern times, it is called "brocade painting" or "silk weaving painting". The emergence of Xiangjin brocade cannot be separated from the jacquard loom in the modern silk history. The French first invented this technique in the 19th century, and the British called Xiangjin brocade "Stevens painting" from the very beginning [1]. Known as a "dragon head", the jacquard loom was introduced into China from Japan at the very beginning of the 20th century. It includes 6 subcategories, three of which are widely used in China, namely, single-lift jacquard, double-lift single-cylinder jacquard, and double-lift double-cylinder jacquard. It is called "an iron machine" in Suzhou, and " a pull machine" in Hangzhou.

Xiangjin brocade is of great value in historical culture and aesthetic education, hence it is often given to foreign friends as a national gift. The author not only collected data on structural characteristics, drawing technique, size and colour collocation, together with an area comparison of Xiangjin brocade, but also focused on the emergence, development and technology of the cataloging process. It is found that Xiangjin brocade has represented an innovative application of the combination of traditional tapestry and painting since the 20th century, on the other hand, it has formed its own style under the influence of various media technology. For example, different media like screens, album pages, wall hangings, scrolls, and fans, are different and homogenous in terms of their composition and expression techniques. From the perspective of design, painting is not only taken as an image, but also as a carrier of the image, i.e., a scroll, screen, fan, or album. In doing so, Xiangjin brocade is a real object, medium, image, or all three in one. Practically and symbolically, Xiangjin brocade vividly records scenes of different historical periods, and truly reflects the social environment and spirit of those times. Thus, it is of precious historical and cultural value for it can offer rich historical data of the economy, culture, society, and customs in the Jiangsu, Zhejiang, and Shanghai regions.

Domestic scholars mainly study Xiangjin brocade from the aspect of art and weaving skills, which are represented by Yuan Xuan-ping's "Inheritance and innovation of modern Chinese brocade art" [1], Yuan Xuan-ping and Xu Zheng's "Hangzhou weaved photograph" [2], He Yunfei's "The artistic features of Du Jinsheng brocade" [3], Liu Kelong's "The flower of oriental art—the art of Du Jinsheng brocade" [4], and Peng Zeyi's "History of handicraft industry in modern China (1840-1949)" [5]. The making of Xiangjin brocade can be found in the third chapter of Peng's book, which involves the development of new

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products and the employment of a new machine. The researchers mentioned above studied the weaving process of Chinese brocade, Xiangjin brocade and West Lake brocade. Some scholars conduct researches on Xiangjin brocade from the perspective of local history and brocade history. The representative works are ”Hangzhou in the Republic of China” edited by Zhou Feng [6], and ”Hangzhou Local Chronicles” edited by the local chorographer of Hangzhou [7]. Besides, few scholars in other countries have mentioned Chinese brocade when studying silk history; for example, the Japanese scholar Nuru Ono’s “Silk Industry in Hangzhou” [8]. Other relevant researches on textile design are in the literature [9-18]. It can be concluded that there have been few studies conducted to analyse the design of Xiangjin brocade in the 20th century. This article attempts to categorise Xiangjin brocade in the 20th century and summarise its design style through field photographs, file archives, fabric structure, file numbers, and analysis of its design features from form, setting, colour design, and the weaving process.

This paper attempts to record and classify 1008 pieces of Xiangjin brocade in the Suzhou Silk Archive, as well as to find out their design features, oriental flavour, and unique weaving techniques. It should be noted that Xiangjin pictures are not only collected in the Suzhou Silk Archive, but also mainly from the Tu Chin Sheng Silk Weaving Factory in Hangzhou, the Suzhou Silk Weaving Factory, private donations and local brocade archives. In addition, the cultural connotation of Xiangjin brocade as a painting medium was also put forward by analysing those brocades’ historical context, images, and style. The five research objectives of this study are listed as follows: 1.to identify, record, and describe 1008 pieces of Xiangjin brocade in the Suzhou Silk Archives, China; 2.to summarizes the design characteristics of Chinese Xiangjin brocade in the 20th century in terms of aesthetics, textile design, and traditional weaving techniques; 3.to analyse the unique weaving techniques and design features of Xiangjin brocade in the 20th century; 4.to put forward a new drawing formula for calculating warps and wefts; and 5.to categorise the design styles of Chinese Xiangjin brocade in the 20th century.

2. Four categories of patterns designed by Chinese Xiangjin brocade in the 20th century

In accordance with different themes, expression techniques, organisational structure, and functions, 1008 pieces of Xiangjin brocade in the Suzhou Silk Archives, China, are divided into four categories: landscape brocade, personage brocade, painting brocade and practical brocade, as shown in Table 1.

Category	-	Representative
Landscape	Images of the West Lake	Nine Brooks and Eighteen Dales, Ten images of the West Lake, West Lake International Expo Bridge, Xileng Bridge, Baoshu Pagoda, Bai Causeway, Solitary Hill, Feixia cave
	Sights of Hangzhou	Qiantang River, Lingyin Temple, Feilai Peak, Liuhe Pagoda, Qiantang River tides, Huagang Bridge
	Well-known Sights in China	Twelve sights of Beijing, Great Hall of the People, the Summer Palace, the Great Wall, Beihai Pagoda, Yunlong rock of the Yellow Mountain, the Lotus Peak, Suzhou Tiger Hill, Humble Administrator’s garden, Jinshan Hill in Zhenjiang, the North Mausoleum in Luoyang, the waterfall of Lushan Mountain, the Bund in Shanghai, Wuhan Yangtze River bridge, Nanjing Yangtze River bridge, the Potala Palace, Sunset glowing in Taihu lake, Zhan Qiao pier in Qingdao
	Well-known sights in the world	Yellowstone National Park, the World Trade Center, Mount Fuji, Statue of Liberty
Personage	Legendary personage	Diaochan, Yang Gui-fei, Wang Zhaojun, Xishi, characters in *The Romance of West Chamber*, characters in *A Dream in Red Mansions*, concubines, characters in model operas
	Religious personage	Kuan-yin Buddha, Panchen Lama, Jesus Christ, the Madonna, Eight Immortals, the three Gods of Fortune, Prosperity and Longevity
	Personage in modern times	Ha Tong, Sun Yat-sen, Chiang Kai-shek, Mao Zedong, Zhou Enlai, Deng Xiaoping, Marx, Engels, Stalin, Clinton, Peake, Xian Xinghai, Nie Er, Lu Xun
Paintings Practical things	Chinese paintings Oil paintings, prints Cigarette paintings, screens, hanging scrolls	Pines, cranes, swans, geese, waxbills, dancing lions, phoenixes, tigers, cats, deer, chickens The Beauty Of Health, Amidst Flowers and in the Moonlight, Stand Gracefully Erect Pavilions and pagodas, lady's-maids, mountains and rivers, master Sun's art of war, the Analects of Confucius, the Diamond Sutra, plum blossoms, orchids, chrysanthemums
Total	1008 Pieces	

Table 1. Categories of 20th century Xiangjin brocade and representative works

2.1. Scenery Xiangjin Brocade

Chinese Xiangjin brocade is indigenous to Hangzhou, with West Lake Xiangjin brocade being the most typical one, thus it has distinct cultural characteristics of the West Lake [19]. As shown in Figure 1, in Xiangjin brocade photos are taken as negatives and full use of strong points of photographic art is made through the form of brocade paintings. Thus, it integrates the styles of traditional national painting, western photographic art, and modern oil painting into one. Combining tradition with innovation, silk weaving paintings have the same effect as photos, being exquisite, vivid and lifelike.

Japanese technologist Yanagi Souetsu argued as follows: "All the handicrafts in history that are closely related to local history and culture have striking local features" [20]. In ancient times, brocade with themes of the Ten Sights of the West Lake already existed. According to "Miscellany of the East Hangzhou City" by Li E in the Qing Dynasty, the eastern part of Hangzhou city was well-known for making silk brocade [21]. Compared with traditional brocade, Xiangjin brocade is more expressive in terms of colour transition and vivid depiction of water waves, clouds, and flowers. In addition to technological innovation, it has adhered to the open spirit of art from the earliest times to the present day.

2.2. Personage Xiangjin Brocade

Personage Xiangjin brocades are images of celebrities, historical figures, national leaders, and religious figures. Among them, religious figures can be categorized into Taoism, Buddhism, Christianity and folk beliefs.

For example, Budda image Xiangjin brocade is created on the theme of gods and goddesses to meet the needs of the market, which truly reflects people's psychological activities of traditional ethics, moral customs, and pursuit of happiness. As shown in Figure 2, its composition and coloration are done on the basis of the artistic skills of Chinese paintings in the past and the luxuriant colours of Western paintings, which have pushed the art of brocade to a higher level. Later, Xiangjin brocade tends to converge Chinese religious culture and select those gods who can benefit people in reality as their themes, just like the three gods of fortune, prosperity and longevity, the eight immortals, Magu, and the god of wealth. The corresponding representative works include Magu's Birhday Offering, Kuan-yin Buddha, Panchen Lama, the Ascension, and the Virgin Mary.



Fig. 1. "Three pagodas at Mandarin Duck Lake"



Figure 2. "Panchen Lama's brocade Thangka"

2.3. Painting Xiangjin Brocade

Painting Xiangjin brocade is mainly woven with silk thread to manifest fine brushwork, freehand brushwork, and Chinese painting that combines fine brushwork with freehand brushwork. As shown in Figure 3, its themes include landscapes, flowers, birds, and figures. Designers often refer to the works of famous painters in south of the Yangtze river like Tang Bohu, Shen Zhou, and Shen Quan, therefore this kind of brocade has tranquility and elegance of ink paintings, but also natural and unrestrained charm silk products [22]. In addition to the use of colour gradation to reveal shadow change, such multi-weft colourful Xiangjin brocade mainly uses the ups and downs of weft threads to form colourful scenery [23]. In terms of painting performance, it inherits techniques of traditional Chinese paintings, religion paintings, New Year pictures, print making, classical oil paintings, and western contemporary paintings. Its artistry exceeds the most precious "double brocade" hanging scroll in the Ming and Qing dynasties.

2.4. Practical Xiangjin Brocade

Practical Xiangjin brocade is a kind of multi-coloured brocade whose two-warp-multi-weft structure becomes a one-warp-

three-weft structure, in which one group of warps interweave the weft to form ground tissue, while another two groups of wefts weave flowers on the ground tissue [24]. As shown in Figure 4, with bright colours and exquisite composition, it draws on themes such as plums, orchids, bamboos, chrysanthemums, platforms, pavilions, ladies, and landscapes. Moreover, it combines the art of traditional Chinese painting with that of decoration and the art of living; hence, it is full of distinctive national characteristics and oriental charm. Practical brocade is the extension of the first three kinds thereof, which combines landscape and figure painting brocade with decorative art and everyday life art. It also belongs to colorful brocades, but its structure is reduced from 2 longitude and multi-latitude to 1 longitude and 3 latitude, and a group of weft and warp interweaves are organised.



Fig. 3. Peacocks and cranes in "Comprehensive painting indicating five norms"

Compared with traditional brocade, Xiangjin brocade highlights its craftsmanship. These products include silk fans, silk umbrellas, screens, hanging scrolls, table girth, bags, carpets, cushions, and clothing, New Year pictures, wall calendars, national gifts, and brocade taking patterns from Chinese paintings in the Song Dynasty and overseas collections. As the West Lake Expo Daily introduced: "Xiangjin brocade can be used for hall hanging, study ornament, orchid boudoir enjoyment, elegance and pleasance" [25]. Business Monthly also reported: "one important art invention which can be used for gift-giving and decoration."[26] The small ones are made of scraps of other fabric products so they can save cost and increase output, warmly welcomed by customers at home and abroad.

3. Artistic Design Features of 20th century Xiangjin Brocade

In this study, 1008 pieces of Xiangjin brocade are divided into four categories, among which, scenery themes occupy 46%, personage themes 23%, painting themes 18%, and practical things brocade 13%. In addition, they have absorbed the quintessence of cultural traditions in ancient and modern times, so their artistic design features are both traditional and unique with regard to artistic style or aesthetic interest. In the following paragraphs we will depict its design features through red dotted line drawings alongside images of Xiangjin (Figures 5-8). The purpose of this is to analyse the shape and elements of the line draft, as well as to manage and layout the composition elements according to the composition, modeling elements and colour. In this way, we can capture the application mode of focus perspective and scattered perspective in the picture. Specifically, artistic design features are summarised.



Fig. 4. Series of scroll paintings

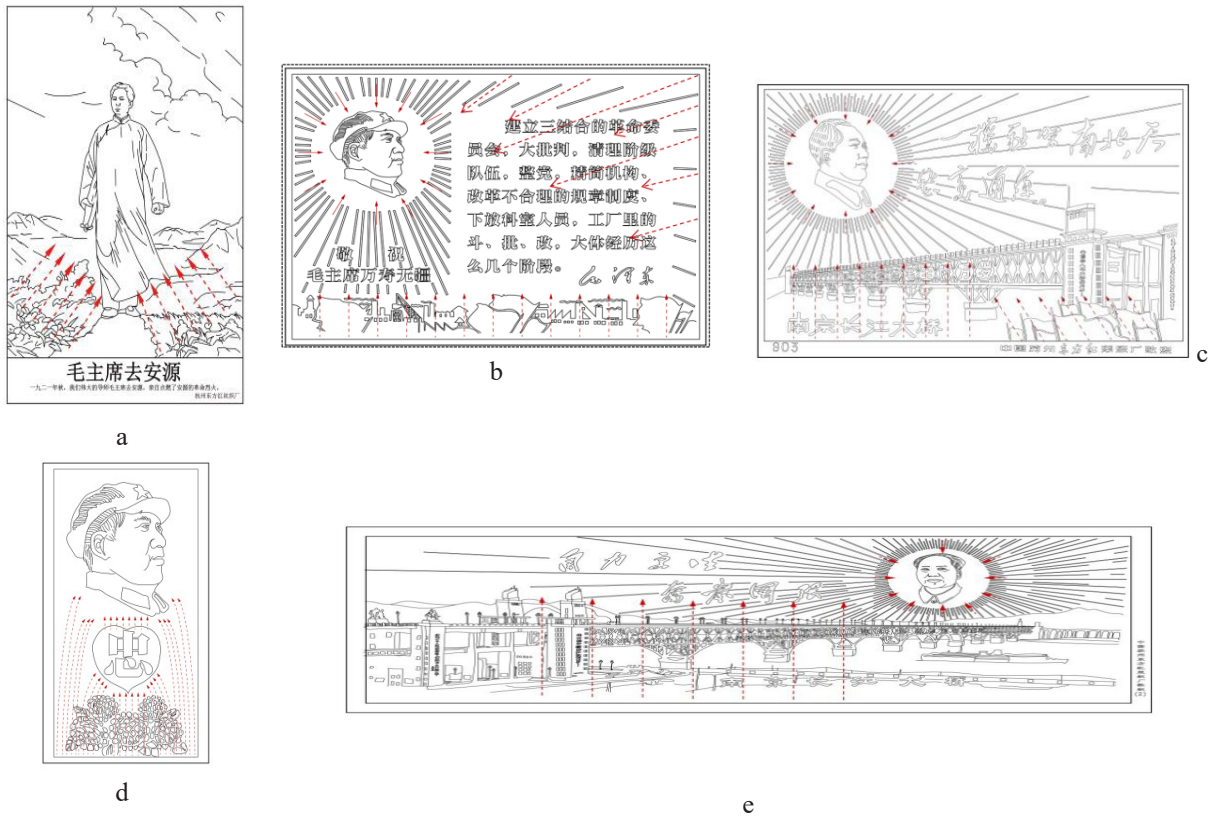


Fig. 5. Perspective demonstration diagrams of Xiangjin brocade

3.1. Characteristics of Art and Design of Xiangjin Brocade Pictures

Modern portrait Xiangjin brocade is analysed from the perspective of iconology, including focus perspective composition highlighting theme patterns, changes in peripheral decoration and regular restrictions on area size layout, and the combining of various theme patterns or multiple theme patterns into central patterns; secondly, the use of complementary, contrast and other colors to give people a strong visual feeling, set off the theme of the pattern and convey a festive and cheerful psychological feeling at the same time. The picture space depicts all kinds of scenes with the method of "focus perspective" to make the vision disappear on the horizon to form a very strong visual space, with the arrangement of the distance and proximity of the characters also taking into account the change of perspective. The arrangement of the foreground characters focuses on the traditional "scattered points" design method, while the prospective character design accords with the perspective law, that is, with the help of focus perspective to strengthen the visual extension effect of the picture, in order to produce a strong sense of depth. At the same time, the "multiple focal points" method is used to narrow the picture space, reflecting the closeness of the foreground picture, as shown in Figure 5.

For example, in the 1960s, the Xiangjin brocade fabric "Chairman Mao goes to Anyuan" (Figure 5 a) was designed and made with reference to the oil painting created by Liu Chunhua. The work was characterised by a large picture size, a large number of colored filaments, complex craftsmanship and strong artistic effect.

From the composition of Xiangjin works, we can capture the application mode of focus perspective in the picture.

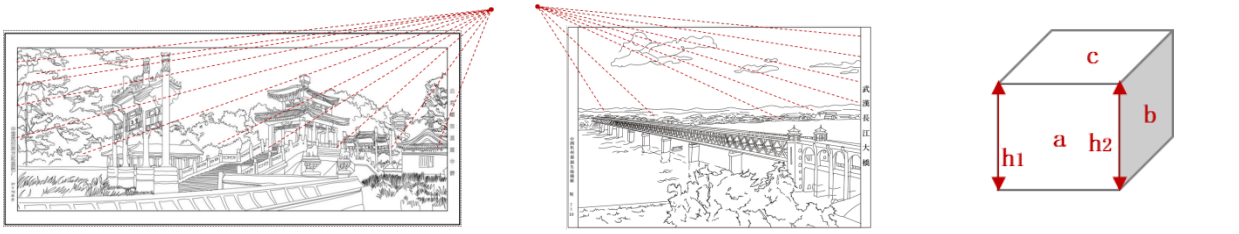
1. The head portrait is arranged like a "label", and its size changes with the change of the background theme, which is not limited by the focus of the vanishing centre..

2. Most of the Xiangjin brocade landscape themes disappear towards the central focus of the distant picture, forming a strong sense of perspective.

3. Most of them use the traditional combination of scattered perspective and focus perspective, with the latter generally disappearing in the picture, from which we can see that this perspective method pulls the viewer into a very strong visual space and can maximise the viewer's imagination.

4. In the visual range, the picture effect presented in the "two-point perspective" is more natural and real, resulting in a sense of intimacy and pleasure.

The authors attempted to compare and analyse the composition of focus perspective in the visual art of Xiangjin brocade through the perspective images of Figures 6 and 7. In Figures 6c and 7c, planes a, b and c represent one-point perspective and two-point perspective, including western landscape painting and traditional boundary painting, respectively. Taking the landscape

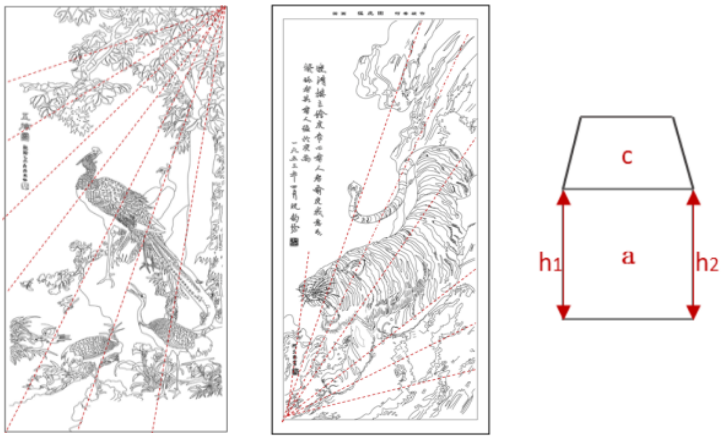


a. Perspective demonstration diagram of Western painting method A of "Tour in the painting of the Summer Palace in Beijing"

b. Perspective demonstration diagram of Western painting method B of "Wuhan Yangtze River Bridge"

.c. Perspective demonstration diagram of the cube perspective effect of the Western painting method

Fig. 6. Perspective demonstration diagram of landscape Xiangjin brocade



a. Perspective demonstration diagram of "five-lun diagram" .

b. Perspective demonstration diagram of "Tiger diagram"

c. Perspective demonstration diagram of the cube perspective effect

Fig .7 A perspective demonstration diagram of the traditional Chinese painting Xiangjin brocade

Xiangjin brocade as an example, the western painting method of "two-point perspective" is used as shown in Figure 6 a, b, c. Among them, a plane produces perspective, and three faces, a, b and c, can be seen, thus when the length of h1 and h2 changes, which meets the requirements of perspective, with the expansion of the depth of field, h1 becomes shorter and shorter, thus reflecting the true sense of space of the picture.

When we take the Xiangjin brocade of traditional Chinese painting as an example (Figure 7 a, b), only two planes, a and c, can be seen: the viewer cannot see the b side, and the a side is directly facing the audience, representing the animal theme in the foreground without perspective. Therefore, most of the subjects of traditional Chinese painting like Xiangjin brocade belong to this type. The h1 and h2 represent parallel heights, while all objects behind animals will change with the depth of field. This structural arrangement has been widely used because it can produce a sense of singularity in depth, which is in line with the practical function of attracting visitors.

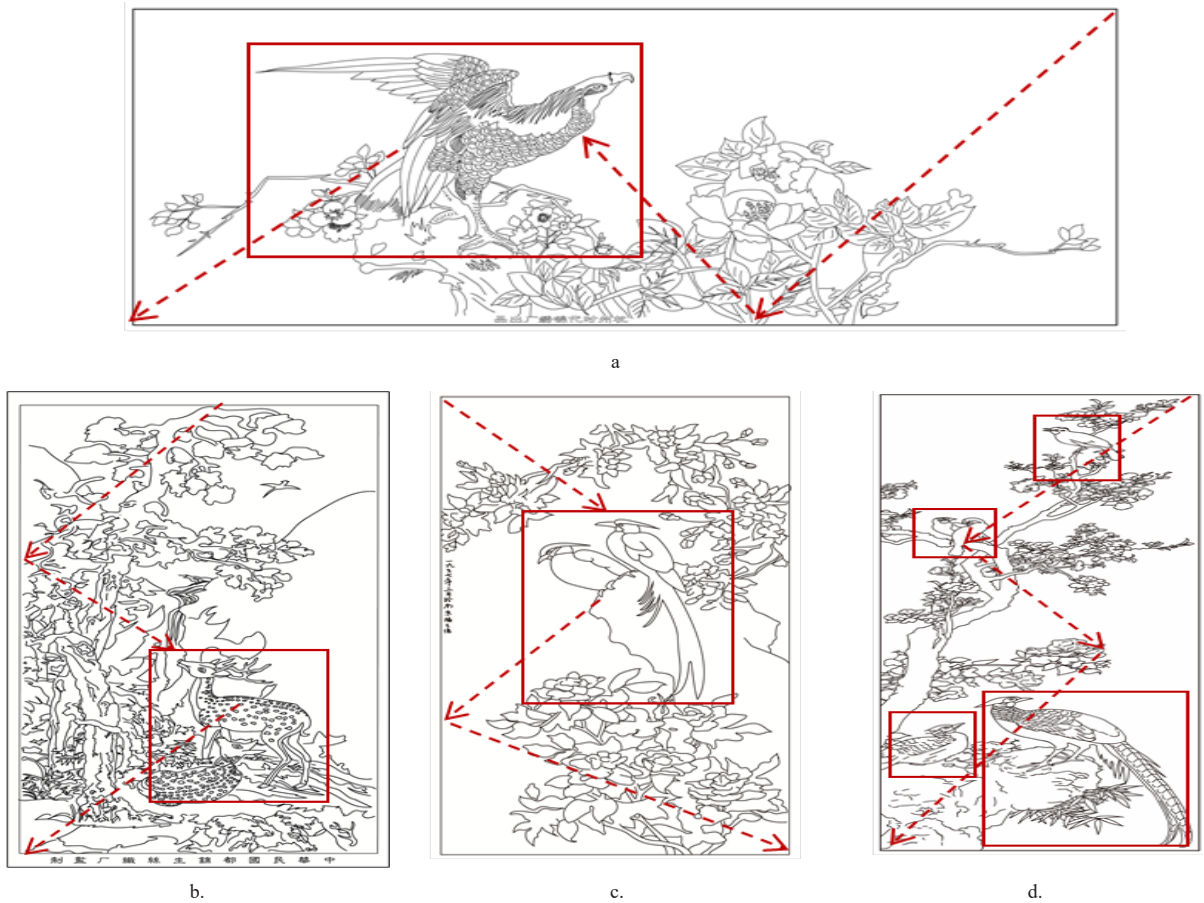
From the comparison of perspective drawings, we can see that different picture effects are produced by the combination of western painting and traditional painting. The influencing factors of the visual art composition of portrait brocade are summarised as follows: Firstly, traditional Chinese painting requires the integrity of picture information for the long scroll vertical axis or horizontal axis composition, and presents a panoramic picture through a high point of view, where there is no overlap between the objects in the painting. In this way, the design composition is more conducive to the development of panoramic description. Secondly, Xiangjin brocade craftsmen affected by the traditional aesthetic still retain traditional composition habits in the process of composition and theme change, as well as traditional Chinese painting, landscape painting and other well-known composition forms. Thirdly, as people's aesthetic transformation needs time, in order to meet the aesthetic needs of people, the integration of China and the West has become a better way of transition. The complete combination of scatter perspective and focus perspective has become an obvious feature of the Xiangjin image composition form.

3.2. The plastic art design of Xiangjin brocade

From the product category of Xiangjin brocade in relation to its shape and theme, its greatest features are "daily" and "civilian", which mainly comes from the market demand. Therefore, decorative patterns from the traditional Chinese painting theme to the western oil painting theme of Xiangjin brocade are first reflected in the stylised modelling of the motif of the pattern, especially in the modelling of "landscape painting", "characters" and "landscape architecture". This stylised modelling is a typical realistic painting decoration style, which creates a new sense of curiosity on the basis of a certain interest in oriental aesthetics. Thus, the modelling schemata of many different shapes of traditional Chinese decorative images have become the main mode of expression in the three-dimensional translation of Xiangjin brocade.

3.2.1. Stylised modeling of the pattern motif

The characteristic of the decorative pattern is that the inductive technique mainly



a b. c. d.

Fig. 8. Z-shaped skeleton pattern modelling and natural element collocation

highlights the typical characteristics of the decorative matrix, forming a more stylised decorative pattern, and the decorative nature of the pattern used in Xiangjin brocade is mainly shown in the stylised modelling of the pattern matrix. It is prominently shown in the clear depiction of figures, flowers, birds and landscapes, as well as in the consistency and regularity of the arrangement, taking landscape and flower-and-bird modeling of decorationism as the center to form a face up to the perspective and squint perspective, showing the z-shaped style. In traditional Chinese landscape painting, modern transformation is carried out in stylised ways, such as mountains, trees, people, clouds, fog, towers and people in close range, in order to grasp the main features of objects and show the characteristics of regional folk customs. The mountains of different shapes are not separated from the modelling pattern of traditional Chinese ink painting; the lines in the picture are rough, simple and clumsy, and the stylised features still retain traditional ink painting decorative features. Xiangjin brocade continues traditional painting techniques to show new things, and craftsmen design its form with reference to the traditional painting mode and experience; at the same time, it has also become a new visual modeling used in the process of Xiangjin brocade weaving.

3.2.2. *Z-shaped model styling*

In Xiangjin brocade decorative patterns, among compositions of picture space forms, the most representative is vertical folding, that is, the “Z” shape. From the spatial point of view, the clear broken branches and lines play a key role in creating the picture structure, and the painter sets up the basic spatial structure of the picture through the method of image position management. The special abstract representation of the image divides the space into upper and lower parts, showing the characteristics of three-dimensional space, and the turning point is the point of the division of heaven and earth. The string branch type is maily used to carry out folding, with the folding place being the branch intersection decorated with a flower, branch and leaf scattered point arrangement. When the composition has the folded branch arrangement, the skeleton has obvious pattern characteristics. The demand of the consumer market determines that the basic feature of silk brocade is “daily” or “civilian”, which leads to the “stylised” expression of silk brocade plastic art. It is prominently shown in the modelling of “landscape, flower-and-bird painting”, “figure” and “landscape architecture”. Stylized modelling creates a sense of novelty on the basis of ensuring oriental aesthetic taste, which focuses on the Z-shaped styling of Xiangjin, the auspicious character mode;ling of “icing on the cake”, and the realistic modelling of the red art motif.



a. Dujinsheng Enterprise productions of colourful tapestry of "Xi" and "Shou"



b c d e

Fig. 9. Auspicious Chinese character pattern of "icing on the cake"

The first category: the decorative shape of the combination pattern. The Xiangjin brocade pattern decoration is represented by the use of adding and combining modelling techniques to form a compound pattern combination by adding or deleting decorative pattern elements according to the design requirements. As shown in Figure 8a, b, c, d, the overall composition structure of flower-and-bird painting is arranged in the form of "Z", "small lining" and "dot, line and surface". In particular, Figure 4c adopts the same kind of decorative pattern and a glyph combination of multiple flower heads at the same time, and it is surrounded by a series of branches, with the local intercept and interspersed combinations pushing out the spatial structure layer by layer. Under the intertwined branches, there is a theme pattern, deer, birds, cranes, etc., or the arrangement of a "one or two gathering" (flowers and birds are like two birds on a branch and a finch on the ground), or "single" (there is only one eagle and peony in the brocade of flowers and birds) or "double" (there are two magpies resting on the branches in the main picture), where the branches and leaves of flowers can be scattered and swayed, and can also form irregular geometry, which is in obvious contrast to the combination of animals, flowers and birds in the main picture.

The second category: "icing on the cake" decorative modelling. It applies patterns on the surface of the theme patterns to enhance the sense of decoration. This kind of decorative modeling is prominently shown in the direct use of Chinese characters as patterns, as shown in Figure 9a, showing the colourful Xiangjin brocade of "auspicious double happiness" and "eight immortal characters" produced by Du Jinsheng in the 1960s. The composition form and pattern of embedded words have been around for a long time. People often embed single or more words with beautiful meaning in the pattern, yet the text does not appear alone as a decorative pattern, but as a central pattern arranged between various flower patterns. Among the most commonly used traditional patterns are phoenixes, fish, peonies, plums, bamboo, chrysanthemums and auspiciousness, which are together woven into Xiangjin brocade, symbolising peace, prosperity and happiness, creating a festive atmosphere.

Figures 9a and 9b show the character "Shou" of eight Immortals. In the hollow words of "Shou" in block letters, there are eight immortals, namely Tieguai Li, Zhang Guolao, Lu Dongbin, Han Xianzi, Cao Guojie, Han Zhongli, He Xiangu and Lan Caizhu. The meaning of the eight Immortals is double as it refers to the combination of the mythological characters of the eight Immortals and the auspicious meaning of "Shou" to express good will in celebrating birthdays. In Xiangjin brocade, 15 kinds of coloured



Fig. 10. Four pieces of "Cigarette Painting Brocade", Size: 11cm×15.5cm

silk lines are used to show the chic and vivid posture of different characters,; the patterns are colourful, bright, delicate and round, and the whole picture is smooth and stable, with "longevity" and "immortality" condensed into one. With its double meaning it is a noble gift for a birthday ceremony. Figures 9c, d & e are framed with a "Fu" character and decorated with animal patterns, such as pigs, sheep, rabbits, chickens, tigers, as well as fairy peach and plant patterns, all of which are consistent with the meaning of the longevity peach, representing immortality in Chinese culture.

3.2.3. Realistic modelling of decorative motif

Among the patterns selected by Xiangjin brocade, there are many shapes with the coexistence of realism and decorative features, reflecting the ingenious integration of the two styles. As shown in Figure 10, cigarette painting is a kind of gift that is placed in a cigarette box. It not only shows the high quality of cigarettes, but also reflects the high social status and elegant demeanor of smokers. Spreading from foreign countries to China, cigarette paintings take silk Xiangjin brocade as a medium to propagandise western portrait art. Xiangjin brocade miniaturises large western representative art works into silk works with a range of 10 cm, which is filled with oriental romance and mysterious artistic conception and meets western people's desire to seek Oriental verve. Nowadays, there exist very few Chinese cigarette painting brocades, and thus they have very high research and collection value. The author was very lucky to take photos of 4 pieces of cigarette painting brocades in the Suzhou Chinese Silk Archives which were donated by Suzhou Tian-ao Special Fabric Co., Ltd. As Figure 10 shows, all those cigarette painting brocades are a 11 cm x 15.5 cm rectangle whose bottom parts are printed with "Arti Grafiche Ricordi Milano Edizioni Beatrice d'Este-printed in Italy". The images were taken from London and reprinted in Italy, and their colours were separated, doubled, overprinted, and neatened with the utilisation of professional dyestuff and screen printing.

3.3. Artistic beauty in terms of colour and picture

Inheriting the main colours of Chinese traditional brocade, Xiangjin brocade is often coloured with warm colours like red, yellow, and green [27]. Unlike the quiet, elegant and simple style of traditional Chinese brocade, it uses gorgeous, rich, and chunky colours to reflect its strong and unrestrained artistic features. Regarding colour matching skills, it employs traditional "color change" skills to make the picture natural, harmonious and unified, while reducing the visual stimulation that chunky colour produces. The use of warm colour with black, white, and gray fully reflects the aesthetic concept of integrity, truth, and beauty. As shown in Figure 11, Xiangjin brocade composition is flexible and vivid, for it combines cavalier perspective and focus perspective together to depict auxiliary objects, such as flowers and birds, at a fine-grained level, with the theme pattern occupying the central position. Doing so, the whole picture is orderly and harmoniously arranged , forming a unified art space.

3.4. Artistic design with irresistible oriental charm

Xiangjin brocade is one of the representatives of innovative products in the silk industry. For example, dragons, phoenixes, lotuses, pines, and deer in the works represent people's desire to pursue fame, fortune, and happiness. As shown in Figure 12, the oriental features of Xiangjin brocade are closely related to Asian people's elegant and restrained aesthetic psychology, therefore symbolism is often employed to achieve a unified effect of sentiment, scenery, and meaning. The use of jacquard can weave points of different colours and lightness into brocade, making the colours soft and comfortable. As for expression techniques, Xiangjin brocade is processed on the basis of photographic negatives, therefore it integrates beautiful silk brocade and life-like landscape painting into one, with double artistic effects and realistic style. As a consequence, Xiangjin brocade is not only an ornament but also a cultural symbol, showing the public's concern for prosperity, wealth, and a bright future. Thus, it is endowed with the profound cultural psychology of the Oriental nations and has become an important symbol of Eastern cultures.

As a pioneer of mechanised and large-scale production in the modern brocade



a b c d

Fig. 11. Brocade (a) and partial drawings (b, c, d) of flower-and-bird paintings



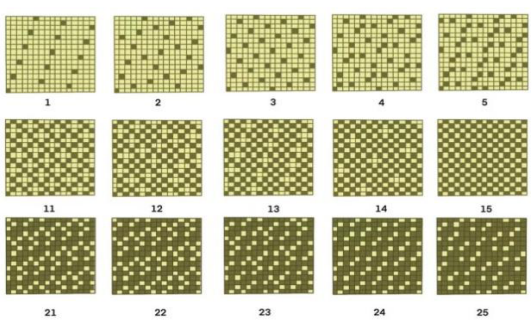
Fig. 12. Tiger brocade

industry in China, Xiangjin brocade took the lead in the innovation of traditional brocade in key processes such as craftsmanship, design and jacquard, and opened up a new era of brocade, from manual weaving to industrial manufacture [22]. From the colouring process of black-white brocade to the mixed-color process of traditional halo brocade, Xiangjin brocade has finally achieved the goal of attaining the tranquility and elegance of traditional ink and blue paintings [28]. Practical Xiangjin brocade adopts daily-use technology to successively weave some daily necessities such as blankets, cushions, bedspreads, and handbags.

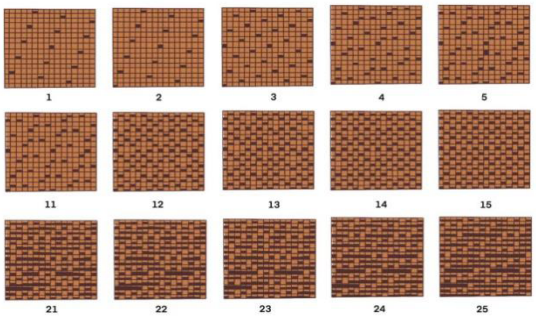
From the analysis above, we come to the conclusion that the unique nature of Xiangjin brocade is the following: First of all, there is the three-dimensional design of the Xiangjin brocade pattern, which absorbs the structure of the two longitude and multi-latitude of Song Jin and the organisation of the warp break of Yunjin and Shujin, with the weft line being able to reach more than 30 levels at most. This makes the visual art of Xiangjin brocade more three-dimensional and hierarchical in terms of the clarity and texture of the changes in visual art. In addition, Xiangjin brocade uses middle transition colour, which makes the fabric colour effect natural, with the colour level changing from light to dark in 32 levels. In addition, Xiangjin brocade uses advertising pigment drawing, sassafras, kneading and other techniques on the basis of black and white to increase the thickness of the fabric, which cannot be reflected by other tapestry art. Secondly, Xiangjin brocade colour diversity design inherits the most valuable category of Song Jin in the Ming and Qing dynasties - the excellent tradition of heavy brocade to develop the organisation method of semi-silk, which can show flowers with warp silk, weft silk and mixed weft and warp with more brilliant colour. Xiangjin brocade weaves various colour patterns which cannot be expressed by manual embroidery. Finally, Xiangjin brocade displays different colour art and visual art through different materials, such as cotton, natural and synthetic fibre, as wel as through fabric structure changes to reflect the pattern mechanism and pattern colour effect, which is very different from traditional tapestry.

4. Unique weaving techniques of Xiangjin brocade

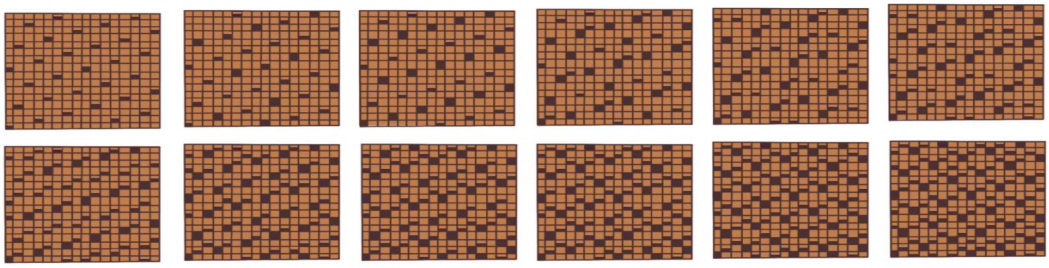
Technology is the means of artistic creation, and art is the social aesthetic pursuit presented by technology. Arts and crafts in any historical period are the outstanding model of the integration of art, science, and technology [29]. The uniqueness of the weaving technology of Xiangjin brocade is that it makes full use of the strengths of Chinese traditional crafts and western weaving skills. Generally speaking, brocade products need to go through 58 procedures, i.e., raw material preparation, pattern design, artisan drawing, rolling plate, jacquard weaving, and inspection. Drawing on the essence of traditional brocade technology in China and the advanced weaving method of “woven photograph” in modern western countries, Xiangjin has pioneered “shadow and light” crafts in scenery brocade and “stick-knife lifting” crafts in multi-coloured brocade [30], which plays an important role in the history of brocade development in China. Among them, the representative weaving technique is fully electronic Jacquard technology, which is completed by the colour Xiangjin brocade stick knife device. Specifically, the hanging method is used to enlarge the width of colour brocade, so that the warp is not only controlled by the jacquard needle, but also hung on the stick knife, which is similar to the Heald frame method for woven fabric. In the basic specifications of black-and-white brocade, due to the different number of hoists installed on the jacquard machine or different warp and weft specifications, density can be adjusted accordingly and new fabric specifications derived at the same time. However, the number of stitches and patterns remain the same, that is, drawing and stepping on a pattern board can produce different specifications of brocade patterns.



a. Polka-dot satin schlieren texture



b. Half-dot satin schlieren texture



c. Combination of polka-dot and half-dot satin schlieren textures

Fig. 13. Brocade satin schlieren textures

4.1. Structure and texture of Xiangjin brocade

Since brocade relies on shadow tissue to sketch a three-dimensional image of a landscape, its structure becomes particularly important. Xiangjin brocade often adopts a two-warp and multi-weft structure, and the number of wefts is sometimes more than 15. Most brocades adopt the shadow-light method, where the satin texture gradually transits from the warp satin texture to a shadow produced by it; thus, the objects' layers, distance, dark side, and sun side can be three-dimensionally realised. The texture of black-white Xiangjin brocade is composed of one group of white warps and two groups of wefts, belonging to a one-warp and two-weft fabric structure. The white warps and wefts constitute a re-flattening of the ground structure, while the other group of black wefts utilises the change of satin texture to show the pattern on the ground structure. The shadow tissue method is used to change the flower structure on the basis of the ground structure to show the layers of brocade. The changes of flower structure mainly include a polka-dot satin schlieren texture (Figure 13a), half-dot satin schlieren texture (Figure 13b), and a combination of the polka-dot and half-dot satin schlieren textures (Figure 13c).

Among them, in the half-dot satin schlieren texture, the blended colour (grey) is produced by the co-occurrence of black and white wefts on the fabric surface. To compensate for the uneven stiffness transition of the polka-dot satin schlieren texture, the half-dot satin schlieren texture is often employed to achieve an even and gentle light effect in the process of image hierarchy transition. Thus, the shading structure of the half-satin pattern is seldom used, except for showing the dark handover line of the figures' facial expression.

4.2. Artisan drawing

Artisan drawing has absorbed Song brocade's "two-warp and multi-weft" weaving structure and Yun brocade's "cross-stitch knotting" weaving technique, and Xiangjin brocade is equivalent to any other handmade brocade and k'o-ssu brocade in terms of pattern organisation and level changes. Artisan drawing design, known as the "soul of brocade", plays a key role in the reproduction of brocade pattern into brocade products. Different weaving techniques have different warp and weft densities. The unique formula of Xiangjin brocade's artisan drawing for counting the number of warps and wefts is "total number of warps = width×warp density" and "total number of wefts = height×weft density".

The craftsman's drawing is depicted in various colours on the craftsman's paper, which is an indication of the pattern structure. In the craftsman's drawing, the vertical direction of the grid indicates that several stripes are used in the lattice, that is, there are several horizontal columns in the normal case of yarn cushioning, and the horizontal indicates the needle distance. The longitude represents the number of jacquard yarns lined with a lattice, which determines the density of the tissue and the mesh effect, and can concisely represent the jacquard effect of the fabric, with different colours representing the high and low position of the shift needle or shift jacquard guide



Fig. 14. Parts of an artisan map of "Kuan-yin Buddha" according to 8×12 cm paper, (a-f): details of head, face, clothes, hand and foot

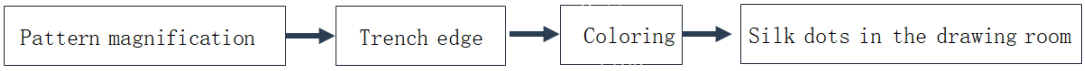


Fig. 15. Steps of craftsman's drawing

needle, that is, the jacquard effect of the fabric.

It takes a lot of work to finish an artisan drawing. For example, to manually draw a black-white brocade with specifications of 27×40 cm will take 45 days for it has more than 2 million points. The specific steps are as follows in Figure 15:

Meanwhile, the author used a computer to draw parts of the artisan map according to the 8×12 cm paper. Figure 14 (a-f) shows details of a Kuan-yin Buddha's head, face, clothes, hand and foot.

4.3. Rolled pattern

Before the ginning process begins, the designer should mark the number of needles and holes that are not used on the sample paper, and if the sample board is not attached, it needs to be explained with words or drawings in order to roll the pattern board. The pattern board on the jacquard machine is a perforated cardboard that controls the rise and fall of warp yarns. The vertical needle corresponding to the hole in the grain plate and its associated warp are lifted, and the warp yarn on the vertical needle where there is no hole is located in the lower layer of the shed. The pattern board is changed for each weft on a single-acting jacquard machine. The rolling of the hole on the pattern plate is carried out according to the corresponding position of the promoted warp yarn in the craftsman's drawing. It takes at least 20 days to roll a 27×40 cm black-white silk Xiangjin brocade manually. It can be woven by machines after connecting every print pattern according to its number and colour order.

4.4. Jacquard weaving

The jacquard of Xiangjin brocade is usually woven by a power loom equipped with a jacquard device, which is done by throwing hand shuttles manually [31]. It absorbs the strong points of Song brocade and Yun brocade and adopts the complex two-warp and multi-weft fabric structure. The rising wefts of woven brocade that belong to the weft rising group vary from 10 to 20 pieces. The Jacquard loom was revised to use a bar-hanging device which makes multiple warps pass through a flower loop under a single jacquard needle, creating 1864, 2200 and 2960 threads. In this way, large brocade can be woven. The loom adopts a 32-piece stick-knife device; due to the limited width of the jacquard machine, the effect of fabric pattern size is mainly improved by increasing the number of sticks and knives. At the same time,

by changing the number of jacquard hangers, and the thickness of the warp and weft density, some new Xiangjin brocade pattern specifications can be derived. Therefore, by drawing a picture of Xiangjin brocade and making a pattern card, different varieties of brocade can be woven, which is another unique feature of brocade weaving technology.

Xiangjin Brocade combines the advantages of the traditional crafts of Songjin, Yunjin and Shujin Brocade together with jacquard technology to create a new brocade technology to form four new weaving methods. The first is the weft-winding method, which involves the shuttle box moving up and down alternately, making full use of the space of the shuttle box to weave multiple groups of wefts. The second is the disk weft method, in which the warp thread A, longitude thread B and multicolour weft thread are treated by winding respectively. Silk thread is then wound on the shuttle and woven in the direction fixed by the jacquard machine. 6-8 sets of shuttles are usually used, and the number of weft threads is fixed according to the woven pattern. The third is the weft throwing method, where the colour weft line is involved between the longitude and weft of the specified position in the weaving process. The fourth is the flower digging method, where the weaving process of the jacquard machine is used to load the middle colour weft lines needed by the pattern, and the color is divided into blocks, zones and segments according to the pattern. It is characterised by thinner warp lines and thicker colour weft lines, and the pattern forms a special texture effect through the changes of different thickness longitude and weft lines.

As an important aspect of folk art, Xiangjin's production, design and sales are closely related to the social life at the time. It truly records social scenes at the time, such as landscape culture, garden culture, architectural culture, folk culture, religious culture and so on, which has precious cultural value.

5. Conclusion

Xiangjin brocade in the 20th century is a product of the new era, and it is doing well in terms of design and sales. The innovation of its weaving techniques lies in the use of different machines from a traditional wooden loom to a Jacquard hand loom, to an electric loom. It is an important symbol of the development of Chinese silk technology history. The focus of this paper is to clarify the artistic modelling and technological characteristics of Xiangjin brocade compared with traditional Chinese brocade varieties, and to explore the modernisation path of traditional brocade in the process of its diachronic development and evolution.

On the one hand, the author summarises and analyses the artistic modelling characteristics of Chinese Xiangjin brocade, and demonstrates that the aesthetics contained in Xiangjin brocade are consistent with the contemporary way of life, on the other the author also explores its reference to, integration with and absorption of the scattered point perspective of traditional Chinese painting as well as the focus perspective of western oil painting. Secondly, the study found that the colour of Chinese Xiangjin brocade has four technical characteristics, from imitating realism to abstract expression, specifically as follows, 1.The development of weaving technology promotes the choice of aesthetic culture. 2. The application of colour skills improves artistic perception. 3. The reappearance of masterpieces reshapes the beauty of art. 4. The process of life gives birth to differences in ideas and expressions. Moreover, the dualization of Chinese Xiangjin brocade in color matching and color blending is discussed. Specifically, landscape painting tends to be fresh and elegant, while flower-and-bird painting tends to be light, soft and dark.

Therefore, Chinese Xiangjin brocade not only needs to inherit and innovate but also needs to integrate traditional tapestry into the contemporary way of life and cultural ideas, just like scholars' exploration of textile innovation and application [32-34]. More importantly, it is necessary to construct an innovative practice path for Xiangjin in modern and even future life, because it has important reference value for the modern transformation of contemporary textile art and product design art value.

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