

## Deriving design and innovation strategies from cultural heritages for design research, practice and education

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### Abstract

Culture can be reflected in design with different symbolisms and representations, and it is one of the main sources for innovations in product design. In the countries or regions where culture resources and intangible heritages are rich, it is often necessary to identify strategies or develop methodologies for the preservation of such resources, and to translate, transform and transcend their values in a sustainable way that is consistent with the time in the evolving context of economic developments of our time. This paper presents a case study on culture based innovation in product design, based on an exhibition and the analysis of the folk art, handicrafts, and intangible culture heritages from Shaanxi province involving a group of local prominent artists. The motivation of this case study is to find out the strength of creative culture industries in western China, and to develop a framework supporting culture based product innovation, through which the knowledge of local artists or craftsmen/women can be integrated to form a collaborative design force. The results of this case study provides strategies and insights on how to build design tools and systems for supporting the emerging creative industry western China.

**Keywords:** Culture heritage, design innovation, crafts, paper cuts, sculpture.

### 1. Introduction

The creative cultural industries in China are enraging with a fast speed. This is becoming the driving force for a sustained development of Chinese economy and environments for the new century (Xu 2009). Shaanxi culture is the roots of Chinese culture, in which the folk arts and handicrafts are still growing after some 4000 years of evolution and development. The folk artists/craftsmen/designers in this province are strong and they convincingly demonstrated their great strength in innovation through the never ending creations. This never-ending generational cycle of creative energy evolves over time, and mirrors the collective human experiences of universe. As individual artists retrace, re-live and re-build upon centuries-old traditional themes, they contribute their own individual sense of wonder and joy to people beyond functional features of products. Over time, consistent hierarchies of order and a collective consensus about beauty form a frame of reference, to help to give individual lives perspective and meaning. The location of Shaanxi province on the map of China is shown in Figure 1, it is the starting point of ancient silk road:



Figure 1: Location map of Shhanxi Province in China

In this case study, a group of prominent artists and craftsmen/women from Shaanxi province was invited to an exhibition in May 2015 in Hong Kong, in order to demonstrate their strength and analyse their works for developing a research framework to enhance their collaborations and exchanges. In this exhibition, called

“Heaven and People in One, Generation by Generation –Shaanxi Culture and Design Innovation”, the objective is to promote the development of Chinese culture and design education, by presenting spectacular showcases for the design industries, design education sectors and the art world in Hong Kong, where the values of such work have often been underestimated, due to historical, political and economic reasons.

The exhibition was the first of its kind in the new building of School of Design, the Jockey Club Innovation Tower, designed by Zaha Hadid (1950-2016). The traditional art work and folk crafts set comfortably with the modern and unconventional curves of Zaha architecture and blended a strong sense of evolution of universal beauty embedded within the traditional art and design work. The exhibits presented by the local masters have proved to be long lasting in items of their strong inheritance of aesthetics and meanings for life, art, nature and a spiritual world of their own.

In this exhibition, the scientists from Ars Mathematica (France) were also invited to showcase their latest development using 3D printing for art and design including the design of ancient Chinese artefacts through mathematic reasoning and 3D printing (Callet 2014), (Lavigne 2014). This was intended to create an interaction and dialogue between the local Chinese artists/craftsmen/women and those from the frontier of international research. This exhibition was a showcase following a detailed case study of the same people in the original positions where they worked and lived their lives through art and design practice. A scaled down version of this exhibition in Hong Kong was held in Rome’s Biblioteca Angelica as part of 2014 international conference on generative art.

## **2. The Driving Force of Creative Industry in Western China**

In order to tie the work of the masters together into the central theme of this exhibition, detailed analyses of each individual designer/artist/craftsmen/woman’s characters were carried out. There emerged a strong sense that they are the driving force for the creative and cultural industries which are still developing in China, and their works may soon become the main stream of design inspirations when the traditional cultural confidence among Chinese designers is awoken and increased. Each master is a highly skilled artist who has spent an entire lifetime dedicated to making a lasting contribution to the overall cultural expression of the entire people in north western China.

The spectacularly detailed and controlled paper cuts of by Xiaomei FAN embody a great deal of the peace of heart, highly imaginative design of patterns and the superb skills of hands that are only demonstrated through the works at master level. Her work displays a convincing combination of minds and hands that cannot be matched by computers or machines. At the core of this work, as shown in Figure 2, is a universal presence of the enduring human spirit that is demonstrated by the very Chinese way and beliefs. Philosophically, it presents the essence of Chinese culture in which the power represented by a paper cut of any animals is softened to include the happy elements of life, while remaining as a symbolism of strength to defend the family values.

Like Xiaomei FAN, Fangxia LIAN is also a master of paper cutting, who learnt and inherited the works of Shulan KU, who developed layered paper cuts to its peak with international acclaims. She demonstrated that the expression of the individual can be always dramatically different, even in the same form of paper cutting. Layered paper is the only way to inherit the essence of traditional paper cuts but at the same time to add colours to the work and give a much stronger 3D feeling to the impressions of audience, as shown in Figure 3. FangXia LIAN worked with Shulan KU for many years, and she established a community group in her own village, and even opened a shop to sell their art works. However, they lacked the support from the local government to run this kind of group in a sustainable way. As a result, they cannot make a living on this form of art even though it has reached a high standard of aesthetic sophistication only by the work of minds and hands.



Figure 2: Paper cuts by Xiaomei FAN in the Hong Kong exhibition (2014)



Figure 3: layered paper cuts by Fangxia LIAN in the Hong Kong exhibition (2014)

Haiyan WANG, taught directly by her father who is one of the most authoritative experts in China's shadow puppets world, has grown up to become an expert of her own generation. As shown in Figure 4, her work has reached the same quality with her father, Tianwen WANG, who is her father, has been many times been called upon by the central government to go to Beijing to repair the shadow puppet works collected by the Great Hall of People. Shadow puppet remains one of the greatest inventions by the Chinese and it still has a magic power to evoke strong emotion and sense of entertainments by the mixture of highly poetic and simplest choreographic design of light and shadow.

In the book published by Tianwen WANG (Wang 2013), readers can be overwhelmed by a show of magical work cut by hands with eyes that are so imaginative and almost childish. The sophisticated cut of lines and curves brought alive a world of master pieces. It must be said that with the most advanced computer technologies we have today, the powerful emotion and happiness evoked by these highly abstract but lively shadow puppet figures capable of playing with human voice and music to present a live show cannot easily be matched.

The tradition of painting faces on the so called horse bowls was started from Qin dynasty when horses were the most important military mighty of the first Chinese empire. Horse bowls were used to feed the horse and they became a symbol of victory and prosperity. The "faces" originated even earlier and it was related to the ceremonial festival of "Shehuo" in Chinese new-year, and it is a strong tradition that can be traced back 3000 years. The horse bowl painted by Xing Zhang, as shown in Figure 5, strikes a strong visual impact with its colourful expressions of ancient spirits and a near invisible smile that casts a deep wisdom through a face that is elevated to a much higher level of cognition. Xing ZHANG also studied horse bowl painting from his master. Now he has established his own studio which is also used as a horse bowl museum in the county of Chen Cang. He has a strong entrepreneur spirit and participated in the making of a documentary "The Masters of Faces". "The Masters of Faces" is a documentary made by the joint research centre on creative culture industries for western China between the Hong Kong Polytechnic University and Xi'an Jiaotong University, which was premiered at the 2014 international conference on generative art in Rome's Biblioteca Angelica.



Figure 4: Shadow puppets by Haiyan WANG in the Hong Kong exhibition (2014)

Other works exhibited in this exhibition included the works of clay sculptures by Master Xin Ming HU and Xiaohong HU, who are relatives educated by Master Shen HU. The collective spirit of this country community manifested itself in many forms and media. Here they have managed to replace the term of "sculpture" with a collection of microcosmic players in the grand theatre of life that we can touch as well as feel. The strong emotional attachments they evoke cannot easily be replaced by other products. These works of figurative models come to our hands more easily. With such strong local characteristics in the form and colour, they have a high quality of universal beauty and likeness, as shown in Figure 6.

Xin Ming HU is the only artist in the group invited to participate in this exhibition, whose works have been adopted by major corporation business in Shanghai to represent their corporate identity. The works by Xing ZHANG, Xin Ming HU, Shen HU, are featured frequently in the designs of Chinese stamps, which is a nationwide recognition for their achievement in arts and design.

### 3. From craftsmanship to design innovation

Many researchers in design went to the countries in search for inspiration or cultural roots in China (Wong 2013). Quite often, they “discovered” the talents of local artists or craftsmen /women and got to report their discoveries in journals or at conferences. More often, people with better educations believed that they could use their thinking or technologies to help those local artists or craftsmen/women to gain better benefits or status. This is not the case for the case study reported here. As pointed out by Kasabach (2011), authenticity in craftsmanship demonstrated by the artists or craftsmen/women is the essential value for any new products derived from traditional culture heritages or matters pieces of the past. In China’s design education system, there is a tendency to view the original works of artists or craftsmen/women only as a source of inspiration in design in a generic and general context. There is a lack of study that is intended to strengthen their works by integrating their knowledge with new design technologies (Xue 2015).



Figure 5: Xing ZHANG in his studio in Shaanxi Province, PRC (2012)

The author argues that this is somehow a misconception and an underestimate of the powers and the true values behind the works of a large number of artists or craftsmen/women in the county who developed their passion and skills of cultural works through their own life experiences. To compare their works with those who receive modern art and design educations from colleges or universities does not make much sense, because they inherited the knowledge and skills (quite often through family or local connections) from a cultural force that has been evolving generation by generation for over several thousands of years. Without learning from this invisible cultural force, many attempts of innovation in design by young people simply won’t work or will be short lived. Therefore, it is necessary to fully understand them and learn from them first, before any new ideas can be proposed to help them (if they needed help at all). In this section, the author takes a close look at the paper cut legend Xiaomei FAN and examines the process of her emergence as one of the best paper cuts artists of a young generation. Her works are shown in Figure 2.

#### 3.1 Emergence of a new generation of cultural force

Born in the village of Zhang Xinyao, Louping District of Ansai County in Northern Shaanxi Province, like many artists in the vast countries, she learnt paper cuts and drawing at a young age from her mother. In 1995 she left the northern Shaanxi and went to Xi’an to make a living there, by making paper cuts in a tourist establishment called the Qin Emperor’s Palace which is now out of business. She started a career in paper cuts from there.

On 25<sup>th</sup> June, 1998, she demonstrated paper cuts on the city wall of Xi’an for former US president Bill Clinton and his wife Hillary Clinton. She published a book titled “Xiaomei FAN – The stories of a paper cut girl from Ansai” by Hunan Fine Arts Publisher in 2001. In 2005, she published a book titled “Paper cutting skills and methods of Xiaimeimei FAN” also by Hunan Fine Arts Publisher [Fan 2001 and 2006]. In 2006, she studied for a

year in China Academy of Fine Arts in Beijing. In 2005 she obtained a patent of her own scissor design which was subsequently made into products in Taiwan. She has some 12,000 students worldwide. She represented the province to have her exhibitions or give lectures in many different countries, winning many prestigious awards for her works. In April, 2014, she was invited to give a lecture in the School of Design of the Hong Kong Polytechnic University on a Master of Design subject (SD5201: Collaborative Design and Technology).



Figure 6: Xin Ming HU's studio in Shaanxi province, PRC (2015)

Xiaomei FAN represents a new generation of artists emerged after the opening policy on economic reform started in the 80<sup>th</sup> of last century. She has transformed herself from a normal country girl in northern Shaanxi province into a world known paper cuts master. She has gone through a lengthy and most of the times painful hardship to establish herself as an individual in the highly competitive modern city of Xi'an. She immigrated to the city of Xi'an when she was only 17, with only her own hands and scissors. She has created a fairy tale of Chinese paper cuts with her convincing story of success, derived by a true passion for traditional Chinese arts and in particular for paper cuts. Her lines of paper cuts are magically matched with the rich and deep meanings of the design with graphics patterns that make huge impacts and lasting memories on the viewers. The accuracy of patterning and symmetry done by her hands can almost beat computers.

Her strong personality and characters of northern Shaanxi tradition are everywhere to be seen in her works that have become the best of Ansai paper cuts of our time. She has demonstrated through her creativity amid hardship and struggle, some of the best characters in Chinese culture, i.e., hard-working, deep study and research, distancing from the trend, i.e., independent thinking, maintaining authenticity, and protecting their uniqueness Kasabach *et al* (2011).

### *3.2 Meaning of cultural inheritance*

The stories of Xianmei FAN may reveal some of the reasons why the driving force for Chinese cultural tradition is in the countries, not in the classrooms of art and design schools in China. In an interview with Xiaomei FAN as part of this case study, she said: In my childhood memory, the best days in a year was the Chinese New Year. My mother was well known for her scissor hands for paper cuts in the county. She had many types of works. Every year when the Chinese New Year approached, many women in the village would come to her for some ideas in order for them to decorate their homes for the Chinese New Year with new paper cuts. My mother has a warm heart and never turned down anyone. A day before the Chinese New Year, the walls and windows of our home would be decorated with various beautiful pieces of paper cuts. Many girls in the village at the age of my elder sisters would come to visit our home. Every year, our home was always regarded the best decorated one by the people in the village. This made me very proud of my mother and her paper cuts, and motivated me to learn from her.

According to Xiaomei FAN, the enemies of Chinese paper cuts are the greediness in human. Amid a rapid wave of economic development, everyone is having a sense of economy and as a result, some paper cuts have become

commercial products. In this way, more people get to know paper cuts and at the same time, the artists can have more economic values for their works. However, in order to meet the time constraints of mass production, some short cuts have to be made. Therefore, many new works have lost the glories and fine qualities of those works of previous generations. In this way, the spiritual investment of human beings in paper cuts has been reduced. When a type of paper cuts became popular in the market, the copied ones appear immediately everywhere. In this way, the paper cuts are losing their charm and values, because they are no longer being created through the original creations of hearts and hands.

As urbanization takes it might deeply into the countries, the villages where Xiaomei FAN used to live seems no longer to be the same with those people in the past. One of the most obvious evidences, according to Xiaomei Fan, is that that people in the villages no longer place paper cuts onto their windows for Chinese New Year, and they do not invite experts to cut flowers for them as they always did in the past.

Xiaomei FAN was taught entirely by her mother (Zhang Zhilan). But her mother died of poor health and hard working when she was at the peak of her creation. Xiaomei FAN was then only 15 years old. The early death of her mother put her through the most painful period of her life for 10 years. However, the arts of her mother also saved her and changed her fate, and brought her to where she is today. To keep her spirit alive in the paper cuts has since become one of the strongest motivations for Xiaomei FAN's work and life. She said:

The paper cuts took me out of deep valleys and mountains of rural life, to the lecture platform of colleges, and to the exhibition halls of foreign countries. To me, paper cuts are not just pieces of papers but flying dreams. They changed my life and brought hopes and dreams to my world. I started paper cutting as a way of surviving at first when I came to Xi'an at the age of 17 with a pair of scissors, but now I put a strong sense of gratefulness to our previous generations to everyday of my work and every piece of my paper cuts.

Xiaomei FAN was the only one of the artists in the group who participated in the exhibition in Hong Kong, who rejected the idea of having her own studio, in order to produce more work to bring profits. Although she is well established and is always on the list of artists of Shaanxi province who frequently represent the province in foreign exhibitions and visits, she still survives her living by teaching paper cuts for young students in a private middle school in Shenzhen. But she always keeps trying to improve the quality of her works.

The symbols for paper cuts are expressions of hopes for life and blessings for nature. Nowadays, when we are creating something, the first thing we might consider is "designing the thing". In my impression, however, the artists of my previous generations had no intention to design or change. All they did, in my view, was with the very true feelings of their hearts, to cut something that reflected their understanding of the beauty of nature. Design, for them means ultimately to achieve a happy feeling in their hearts and confirm their beliefs. In particular, design does not necessarily mean ever expanding the scope of the issue, but rather, it keeps the imagination in a confined focus in order to achieve high quality."

There were many artists of paper cuts in northern Shaanxi province in the past. Almost every woman knew how to do paper cuts. They, however, never considered themselves as artists. Paper cutting was regarded by them as a common skill that was a part of their lives. For example, in my home village, paper cuts are called "Flower cutting". Flowers are the symbols of life in the hearts of the women who lived their entire lives in the countries in northern Shaanxi province. In their eyes, flowers also included all the birds and animals. Paper cutting is a tradition evolved to become their spiritual needs. For several thousands of years, the paper cuts in northern Shaanxi province were inherited in this way.

### *3.3 Inspirations for product design*

Every individual has a different understanding of beauty in their hearts. The artists of previous generations never mimic others in their creations, according to those who participated in the exhibition on Shaanxi Culture and Design Innovation. Their expressions of art work all come from their true feelings about themselves and nature. It would be enough only if they could just express their real feelings in their works, and all of them seem to have managed to develop characters of their own in the way they survive, while keeping their works in line with those which can be found in the heritage. One of the obvious lessons that has been learnt in this case study is that we as designers or design educators, need to understand them better, and we need to view them as successful stories instead of view them as the ones who might need the help with modern design thinking or new design technology.

As for the creative industry, one obvious challenge for many in the industry is how to produce new artefacts that have economic values but also inherit strong cultural meanings. There is no systematic way for achieving this

(Lin 2014). A collaborative approach is needed in order to work with the artists and enlarge their influences in the design process of new products, while protecting their individual strength to achieve a sense of transcendence in culturally inspired design practice. Such a practice must create opportunities for others to join the collaborative efforts in order to achieve sustained economic values.

### 3.4 Implication for design education

Design education in China lacks serious consideration on how to evaluate this significant cultural force which grew from Chinese art roots with a large number with formal education in design. Quite often, traditional cultural heritage and the people who created this heritage for many generations are treated as sidelines of the formal design education. Fine quality of Chinese art works and the skills of handicraftsmen/women never found a place in class rooms of design schools even with some of the most distinguished art academies. The curriculums in these design institutions are overwhelmed with western theories and technologies in design research and practice, largely due to the fact that in the last 30 years, many design teachers went abroad to study for their degrees. When they came back to China, they turned to adopt modern ideas about design approaches without critical review of the contexts in which these ideas have been born. In this context, it is particularly difficult to consider the cultures of their own roots as an important factor in formulating their design education and practice strategies. Therefore, the author has tried to use this case study as basis for building up the arguments for design education at to issues. One is that the cultural wisdoms and art traditions do form an important part in forming new generations of designer in China who are aware of strength and limitations of their own design sources. Another is that the traditional knowledge embedded in vast cultural heritages and existed among a large number of artists, handicraftsmen/women can be utilized in modern designs for innovation embracing western design thinking and design technologies.

## 5. Conclusions

Geometric research can be learned through practice, and this is clear evidence that the aesthetics of curves and balancing can be demonstrated mostly only through the collaboration between hands and brain. Perhaps this can be understood that in the imaginative world of artists, the aesthetics can surpass Mathematics or even computers. Accuracy in geometry does not guarantee creativity and imagination. Over reliance on computers by the new generations is a danger of losing the creative power as well as the enjoyment that artistic creations bring to our lives through skillful hands. There is obvious a lack of such skills in modern design schools throughout China where foreign ideas and technologies are more desirable for the students and teachers (Li 2011).

For example, the work of Xiaomei Fan has great values for inspiring product design using new design technology, Figure 7 shows the transformation of her paper cut to a 3D design that used a shape grammar based generative design system Tang *et al* (2014).

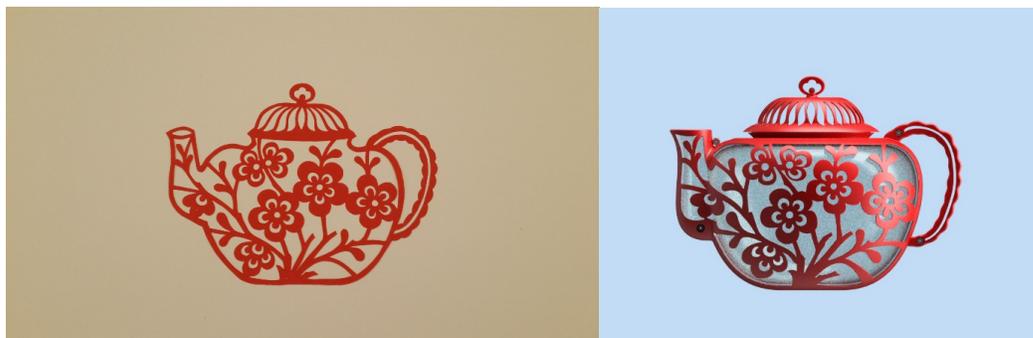


Figure 7: From a paper cut to a 3D product based on the work by Xiaomei FAN

This case study is intended to identify inspirations and ideas for product design innovation embracing new design technologies that can turn artistic imagination and aesthetic articulations into tangible products that help the creative industry in western China. In this paper, the author has highlighted the strength of those artists/craftsmen/women, who spend their life time to inherit and preservation cultural and artistic traditions. But they lack the understanding of design process and lack the knowledge and technology to turn their original art ideas into tangible products that can be more easily identifiable for the new generations. Their knowledge and skills have great values for design education. But in product design such knowledge and skills have yet to be fully utilized. In a way, their knowledge and skills are being lost as the society transforms itself into global

economy (Heskett 2001). The current and future work by the author following this case study is to develop a framework for product innovation based on the preservation of cultural heritage. These artists are to be involved in the collaboration to use the latest digital techniques including generative and evolutionary design techniques combined with 3D printing. In the literature, there are researches in these area that can be usefully integrated to support such collaboration using generative design approaches, (Frazer 1995), (Soddu 2013), and emotional design approach (Norman 2013).

Based on this work, the author is formulating a computational framework that provide inference support to the three essential actions of “translation”, “transform” and “Transcending” in the process of culture inspired design and innovation. This will involve the development and implementation of a design tool, that encourage and help the artists and craftsmen/women in Shaanxi province to develop new products based on their knowledge and skills. In this way, their knowledge and skills will be represented in computational terms and digital forms that can be more easily understood and appreciated by the young generations especially the young design students. Combining semiotic and semantic analysis with AI based design techniques can provide powerful support to designers, artists, and craftsmen/women to bring their intangible culture heritage alive in the process of developing the creative cultural industry that provide economic, social, cultural and environmental benefits to the people in the region.

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