

Study on the Paper Flower Craft and Derivative Cultural and Creative Commodities of Bionic Pith Paper: Actor-Network Theory Perspective

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ABSTRACT

Pith paper is a native plant in Taiwan and an important cash crop of aboriginal tribes. The pith core of the plant was purchased by the Hakka people, made into paper flowers by Minnan people, and finally sold to traders. Therefore, the craft of pith paper flower can be a traditional craft industry symbolizing ethnic integration in Taiwan. Through literature research, it is found that pith papercraft gradually developed industrial-economic characteristics with different values in the Qing Dynasty, the Japanese-ruled period, and even after the Second World War. In the context of the raw material economy in the Qing Dynasty (1683-1895), pith paper was made into rice paper for painting and transported to Guangzhou on the mainland for sale. Under the influence of the popular aesthetic economy during the Japanese-ruled period (1895-1945), the pith paper flower became a popular and fashionable decoration in Japan. In the post-war period (1945-1999), the local characteristic craft industry economy developed rapidly. As home ornaments of essential festivals, many paper flowers were exported to Europe and the United States, contributing to the once economic miracle of Taiwan. However, with the rise of the plastic industry in 1958, the plastic flower replaced the pith paper flower year by year, making the pith papercraft industry decline gradually. From the perspective of actor-network theory, this study found that the craft of pith paper flower has taken on a new look under the prevalence of cultural and creative industry in recent years. As a core actor and obligatory passing point (OPP), Taiwan Pith Paper Association (TPPA) promotes bionic pith paper plant skills. Community colleges also promote and convey the culture and bionic skills of pith paper plants in the reused space of old buildings. These actions also further inspired the participation of university teachers and students majoring in design. The connotation of bionic creation is deepened and enlarged by implementing bionic design courses and competition of pith paper plant. Following the cultural and creative industry recipe of "Light Craft × Friendly Craft × Micromanufacturing = Creative Economy," it has opened a new future of Taiwan's pith papercraft's artistic and creative design.

Keywords: Pith paper, Pith paper flower craft, Bionic design, Actor-network theory.

1. INTRODUCTION

Since the Ministry of Education of Taiwan launched the "Practice Program of University Social Responsibility (USR)" in 2017, its primary purpose has been to strengthen the connection and cooperation between universities and regional industries. Moreover, try to play a crucial role of local think tanks in regional development. It may successfully drive the innovative development of small and medium-sized enterprises and community culture. This study takes one of the USR projects of Fo Guang University in Yilan County as an example to demonstrate the promotion of pith paper

flower craft. It also sketches the vision of regeneration and sustainable development of the local traditional craft industry from actor-network theory.

The characteristics of several key actors in the community network of pith paper flower craft in Yilan County are summarized as follows. Huayu flower shop is in the old urban area of Yilan City, mainly engaged in making wedding and funeral wreaths. Mr. Huang Dehe, the first-generation operator, learned from his mother the flower-making skills from Japan. He also learned from maestro Pan Niu. He is a critical preserver of intangible cultural assets in Yilan County. At present,

Miss Li Lihua, Mr. Huang's daughter-in-law, is responsible for teaching bionic flower art. Mr. Chen Jianhua, a local environmental protection expert, found that the art of pith paper flower was environmentally friendly, so he established the Taiwan Pith Paper Association (TPPA) in 2017. Through in-depth cooperation and connection with Huayu flower shop, Pith paper empowerment workshop, and the Culture and art studio of pith paper, they strive to revitalize the knowledge of Taiwan pith paper and promote the learning of bionic flower art.

The present study has cooperated with Huayu flower shop since 2015 in combination with the implementation of elective courses or independent learning courses of the university design department. The initial goal of the cooperation is for college students to learn the creation of bionic pith papercraft from artisans. Later, the bionic pith paper flower corsage was designed with the county flower Chypre of Yilan County as the creative theme. From 2017 to 2019, the implementation of community craft courses catalyzed cooperation with TPPA to carry out pith paper bionic design. Since 2020, the cooperative development of cultural and creative products derived from pith paper has enabled the innovative development of Taiwan's unique pith paper culture to continue.

In this research, we investigate the development of the pith papercraft industry of Taiwan by literature review. This study explores the transformation of the pith paper industry from the Qing Dynasty, the Japanese-ruled period, the post-war period of the Second World War, and even in recent years. From the perspective of actor-network theory, this paper also examines the dynamic process of how Taiwan's pith paper society, as a core actor, promotes the bionic art of pith paper. One of this research focuses on clarifying the interactive relationship in the social network of local pith paper culture and creative industry. This study summarizes the innovative trend and new opportunities of the modern pith paper bionic creative industry.

2. A BRIEF REVIEW OF ACTOR-NETWORK THEORY

Actor-network theory (ANT) is a set of research approaches to construct scientific knowledge, which explains the formation of scientific knowledge from a social point of view [1, 2]. ANT plays a pivotal role in many research fields. [2] believes that many non-human factors will affect the network structure in the operating mechanism of the real world. Therefore, ANT attempts to extend the concept of "non-human things," using actors to reconnect the images constructed by people between nature and society.

Action is the critical element of the relationship connection between actors and the self-organization of

network structure. The research process needs to continuously track the action trajectory of actors to understand how actions are complete and how network relationships are derived [3-5]. [2] called this process translation. Translation refers to the interaction between actors due to the actions of other actors. The translation of actors produces the transformation of interests and goals. Through the translation of language and words, the appearance or meaning of actors can be changed, adjusted, and shifted. Finally, it will form a stable whole with other actors and form a consistent external representation [1-6]. [7] believed that actors must define the formation of actor-network to form the ordinary meaning of things. Heterogeneous things need to have an Obligatory Passage Point (OPP) for translation in this process. All actors make transactions, representations, and understandings in the OPP to generate and reach possible communication.

The structuring of inter-organizational relationships is an essential mechanism in ANT. It means a social system in which organizations are entangled to achieve self-interest goals or solve specific problems [8]. In particular, the derivation of the relationship between organizations will vary according to the characteristics of different tasks. Under formalization and informal mechanisms [9], organizations will constantly shape specific relationships through negotiation and commitment [10] that emerge the dynamic processes of relationship governance. [11] pointed out from the perspective of dynamic stability that actors can form a state of the mutual constitution with the existing network to form a different structure.

3. RESULTS AND DISCUSSIONS

3.1. Historical Development of Traditional Pith Papercraft Industry

Pith paper gradually developed the characteristics of the industrial economy with different values in the Qing Dynasty, the Japanese-ruled period, and the post-war period. Figure 1 demonstrates the creation process and the exhibition of bionic pith paper flowers.

3.1.1. Qing Dynasty Period (1683-1895)

The industrial economy of this period was dominated by the raw material economy (Figure 1(d)), but the supply of raw materials was unstable due to internal ethnic fighting. In 1846, artisans in mainland Guangdong taught the method of making pith paper. In 1884, Taiwan's export routes were blocked and could not be exported in the Sino-French war. The conflict between the aborigines and the Han people in Dakekan in 1886 and Sa-kak-eng in 1891 led to a shortage of pith paper raw materials. After these internal difficulties, the

manufacturing industry of pith paper flowers was affected and even closed.



Figure 1 The creation process and the exhibition of bionic pith paper flowers. (a) Pith tree and (b) pith core in the trunk. (c) The process of tongtuo is to insert the bamboo rod into the trunk and use the upward impact force to pull out the pith core. (d) Pith core is not only the raw material for making pith paper flowers but also traditional Chinese medicine. (e) Cut the pith into small pieces. (f) The act of cutting the pith into thin paper is called pulling grass. This craft is facing the crisis of losing its skills due to the decline of the pith paper flower industry. (g) Dye the tissue paper and prepare the petal basic paper mold. (h) Bionic pith paper flower production. (i) Art exhibition of bionic pith paper flower.

3.1.2. Japanese-ruled Period (1895-1945)

The industrial economic characteristics of this period were mainly the export of art crafts. At that time, in line with Japan's Meiji Restoration policy of "cultivating and developing industry (しよくさんこうぎょう)," the craft of pith paper flower was successively exhibited at well-known fairs and won awards. Including the fifth National Industrial Exhibition held in Osaka in 1903, the 1904 St. Louis World Expo, and the exhibition and award-winning of Jinquanfa Pith Paper Co., Ltd. at the Paris World Handicraft Exhibition in 1916.

So far, Taiwan's pith paper flower went to the international fashion industry at that time. In 1910, the purchase contract right of pith paper was controlled by the Taiwan Development Co., Ltd. Hsinchu (1926), Hualien and Taitung (1935) successively set up pith paper associations. They expanded the scope of raw materials and procurement of pith paper. At this time,

Taiwan's pith paper products were exported to China, Japan, Hong Kong, Europe, and the United States.

3.1.3. Post-war Period (1945-1999)

At this time, as a local feature industry in Hsinchu and as home accessories for essential festivals, many pith paper flowers were exported to Europe and the United States, which became one of the wonders of Taiwan's handicraft economy at that time. However, since 1958, due to the gradual development of the plastic flower industry, the pith paper industry began to be impacted. In 1965, due to high wages, changes in export policies, and other factors, the pith industry fell into a downturn. Until 1999, there was only one pith paper company left in Hsinchu. In recent years, with the trend of cultural creativity, the craft of pith paper flowers has taken on a new look, including the "Nanmen Pith Paper Industry Senior Forum" held in 2002 and 2012 to start the prelude to industrial revitalization. Starting from 2018, the three-year rooting program of pith paper technology aims to cultivate pith papercraft talents.

3.2. Analysis of Bionic Art and Cultural Creativity of Pith Papercraft by Actor-Network Theory

Figure 2 is a schematic diagram of the actor-network of OPP with TPPA as the core actor. The propagation of bionic pith papercraft is an OPP to revitalize the traditional pith paper flower technology. When TPPA connects different actors for translation, its sequential objectives can be communicated and satisfied. In addition, the injection of funds from the public sector has promoted the actors' enrollment and mobility of bionic pith paper. Such actions are the traditional bionic creation experience and enter the viewing situation of pith paper art and culture and promote the bionic design of the cultural and creative industry path.

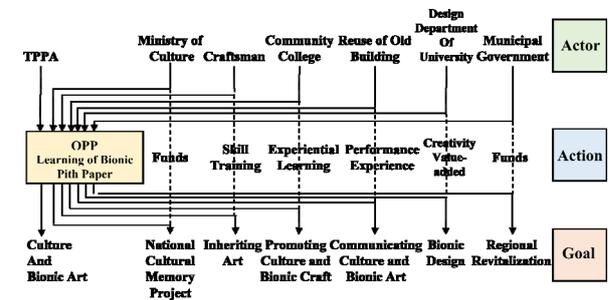


Figure 2 A schematics of actors and OPP of bionic pith paper flower craft.

Figure 2 shows the mobilization of the bionic craft of pith paper promoted by actors such as Pith Paper Cultivation Workshop, Pith Paper Culture, an Art Studio, and Huayu Flower Shop. Promoting the action plan of

the National Cultural Memory Bank, TPPA connects the experiential learning of pith paper art in community colleges and expands to convey pith paper culture and bionic art through the network of reuse of old buildings. Finally, it promotes the translation of pith paper culture and bionic craft into the design competition of bionic design and regional revitalization.

Figure 3 shows the network relationship of actors, showing the interaction and communication between actors. Zone I show the process of overlapping and translation of TPPA as OOP. Through the implementation of the National Cultural Memory Project, TPPA has derived action plans such as bionic creation (Figures 1(g)-1(h)), performance and communication (Figure 1(i)), and preservation of bionic craft. It also changed the curriculum learning model of community colleges and promoted the reuse of old buildings. Finally, the bionic craft of pith paper can be preserved by publishing a thematic book of pith paper laboratory.

Zone II shows the relationship network of derivative cultural and creative commodities structuring with artisans from the bionic design course of teachers and students at the university's design department. The course in one semester is divided into three stages. The first stage is to construct the knowledge of the pith paper flower industry, including establishing students' cultural knowledge of pith raw materials, industry, and folk arts. We also went to Fushan Botanical Garden for a field investigation on the growth of pith trees.

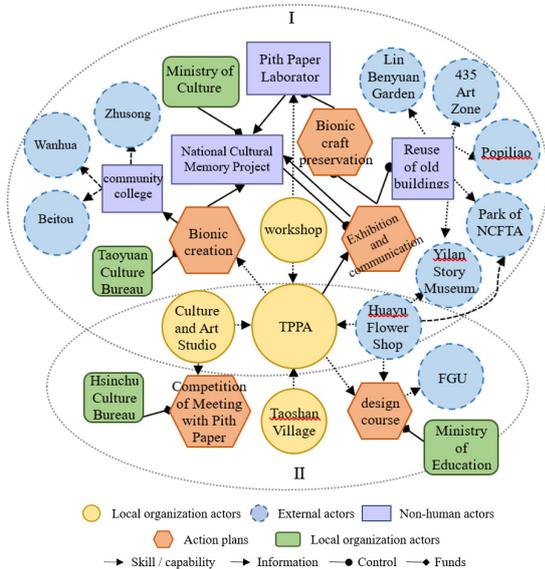


Figure 3 Diagram of actor-network relationship.

The second stage is the feedback design of skill learning and flower-making process. Take the bionic creation of multi-petal flowers (such as gardenia, rose, and iris) as a challenge, organize the steps of the production method with photographs, and reflect on the

design into a poster to provide learners with a visual reference for future creation and design (Figure 4 (a)).

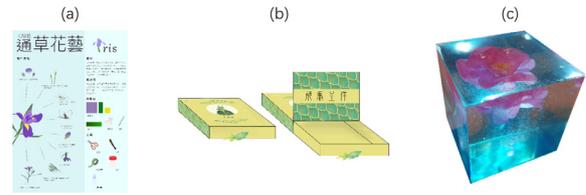


Figure 4 Cultural and creative commodities of bionic pith paper. (a) Flow chart of iris bionic creation. (b)

The packaging design of the wedding cake named "Prosperity brought by the dragon and the phoenix" is drawn with pith paper. (c) Fix the pith paper flower in epoxy resin to show the bright texture of paperweight through the light.

The third stage is the design practice of creative commodities. This actor-network shows how non-human actors, such as raw materials, industries, folk arts, and other cultural knowledge, can carry out creative value-added enrollment and mobility. The dynamic process of these actors shapes the industrial development formula of "light craft × friendly craft × micromanufacturing = creative economy."

They successfully developed a series of cultural and creative commodities, such as wedding cake packaging design (Figure 4(b)), serving-tea omamori, wedding invitation, wedding dress accessories, wedding rice, seat gift, paperweight (Figure 4(c)), lamp holder and other products. The competition called "meeting of pith paper and modern times" is mainly aimed at regional revitalization by the local government to promote the winning works of the competition to achieve the results of mass production and sale. The designer of "NaoK, "the first prize in 2019, tried to use salt water to soak pith paper to present and experience the visual details of lamps with the crystallized surface texture after drying.

4. CONCLUSION

As a native plant in Taiwan, the pith paper grows in flat land or low-altitude mountainous areas. The pith core is widely used as the raw material to produce pith paper flowers. The craft industry of pith paper flowers has almost disappeared in Taiwan around 2000. Only a few communities with the vision of revitalizing the pith paper culture kept inviting the elderly to dictate history to preserve their memory. In 2017, TPPA aimed to spread the bionic pith papercraft, re-examine the industrial history, materials, and technology, and develop a new opportunity for the pith papercraft.

From the perspective of TPPA as the core actor, we can summarize three crucial features of the actor-network of Taiwan's pith paper creative industry. (1) Different actors carry out dynamic network connection

and structuring due to the spread of bionic pith paper and paper flower craft. From the transfer of bionic craft to bionic design, connect local creation and develop cultural creativity. (2) Although making flowers of pith paper is time-consuming, the experiential learning of bionic pith paper is beneficial to provide learners with aesthetic life experience and establish cultural knowledge. Its promotion is extended to community colleges and university design departments. In particular, the bionic design connected by structuring the relationship network between artisans and university design departments is a successful model for developing the cultural creativity industry in the future. (3) Whether it is the action plan of the National Cultural Memory Bank or the development of bionic design and pith paper design competition, it is necessary to organize actors to strive for the injection of public sector funds actively. Finally, it can promote and realize the bionic creation of pith papercraft, the appreciation of pith paper art and culture, and the regional revitalization vision of bionic design.

AUTHORS' CONTRIBUTIONS

Y. F. K. contributes significantly to the supervision and conceptualization of this study. Y. F. K. also performs teaching experiments, field studies and prepares the original draft. H. C. C. contributes the analysis of this study and the manuscript preparation and editing.

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REFERENCES

- [1] M. Callon, and B. Latour, Unscrewing the big leviathan: How actors macrostructure reality and how sociologists help them to do so, In K. K. Cetina, & A. Cicourel (Eds.), *Advances in social theory and methodology: Toward an integration of micro and macro-sociologies*, Routledge & Kegan Paul, London, UK, 1981, pp.277-303.
- [2] B. Latour, *Reassembling the social: An introduction to actor-network theory*, Oxford University Press, London, UK, 2005.
- [3] M. Callon, Some elements of sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay, In J. Law (Eds.), *Power, action, and belief: A new sociology of knowledge*, Routledge & Kegan Paul, London, UK, 1986, pp. 196-233.
- [4] M. Callon, and J. Law, Agency and the hybrid collectif. *South Atlantic Quarterly*, 84, (1995), 481-507. DOI: <https://doi.org/10.1515/9780822382720-006>
- [5] B. Czarniawska, and T. Hernes, *Actor-network theory and organizing*, Copenhagen Business School Press, Copenhagen, Denmark, 2005.
- [6] S. Gherardi, and D. Nicolini, Actor-networks: Ecology and entrepreneurs, In B. Czarniawska, & T. Hernes (Eds.), *Actor-network theory and organizing*, Copenhagen Business School Press, Copenhagen, Denmark, 2005, pp.285- 306.
- [7] M. K. Chung, B. W. Tsai, and D. J. Lu, Assessment of PPGIS and Community Development by Actor-Network Theory A Case in Meinung Yellow Butterfly Valley, *Journal of Geographical Sciences*, 64, (2012), 21-44.
- [8] A. Van de Ven, G. Walker, and J. Liston, Coordination patterns within an inter-organizational network, *Human Relations*, 32(1), (1979), 19-36.
- [9] M. Sobrero, and S. Schrader, Structuring inter-firm relationships: A meta-analytic approach, *Organization Studies*, 19(4), (1998), 585-615.
- [10] P. S. Ring, and A. Van de Ven, Developmental processes of cooperative inter-organizational relationships, *Academy of Management Review*, 19(1), (1994), 90-118.
- [11] M. Kilduff, W. Tsai, and R. Hanke, A paradigm too far? A dynamic stability reconsideration of social network research program, *Academy of Management Review*, 31(4), (2006), 1031-1048.