Costume and Culture Studies
Volume 2, Issue 4, 2024, Page 44-55
https://doi.org/10.6914/ccs.020405

Costume and Culture Studies

Research on the Packaging of Agricultural Products in Sichuan Province Empowered by AIGC in the Context of Intangible Cultural Heritage

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Abstract

This study examines the integration of intangible cultural heritage (ICH) into agricultural product packaging through generative artificial intelligence (AIGC). ICH, as defined by UNESCO, represents cultural practices and traditions integral to a community's identity. However, many regional ICHs, such as Sichuan shadow play, are at risk of being forgotten. This research aims to revitalize such heritage by embedding its artistic and cultural elements into packaging design, thus enhancing the aesthetic and cultural value of agricultural products.Using AIGC platforms like MidJourney and Qiyu AI, designers can efficiently extract, reconstruct, and integrate traditional elements, including patterns, colors, and imagery, into modern packaging. The study emphasizes the role of these tools in simplifying design processes, reducing costs, and fostering creativity. By leveraging narrative science and emotional design, the packaging not only conveys cultural stories but also strengthens consumer engagement, regional identity, and product differentiation.The findings highlight the dual benefits of preserving cultural heritage and enhancing the market competitiveness of agricultural products.

Keywords generative artificial intelligence, intangible cultural heritage, agricultural products packaging

Article History **Received:** July 25, 2024 **Accepted:** July 30, 2024 **Published:** December 31, 2024

To Cite This Article Hang REN .(2024). Research on the Packaging of Agricultural Products in Sichuan Province Empowered by AIGC in the Context of Intangible Cultural Heritage. *Costume and Culture Studies*, *2*(4), 44-55. https://doi.org/10.6914/ccs.020405

1 Introduction

According to the definition provided by the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, "intangible cultural heritage" refers to the practices, representations, expressions, knowledge, and skills, as well as the instruments, objects, artifacts, and cultural

spaces associated with them, which communities, groups, and, in some cases, individuals recognize as part of their cultural heritage. However, for various reasons, some geographically specific ICH faces the risk of being underappreciated or even disappearing entirely.

To better disseminate intangible cultural heritage, it is necessary to employ alternative forms or vehicles to expand its reach. According to Donald Norman (2004), for a product to be successfully utilized, the user must share the same mental model as the designer. Designers must translate the information conveyed by the product through a "systemic image." The design vehicle chosen for this study is the brand packaging of agricultural products, which reaches a wider audience, is used more frequently, and engages a larger group in the communication process.

With the assistance of generative artificial intelligence technology, it is possible to enhance the communication of intangible cultural elements and improve the efficiency of agricultural packaging design.

1.1 Intangible Cultural Heritage Theme Product Design Strategy

Intangible cultural heritage is an important symbol of the historical and cultural achievements of a country or nation and forms a vital part of China's rich traditional culture. To a certain extent, intangible culture represents the unique cultural memory of a nation, whose inheritance and application values are worth exploring in depth. It is characterized by uniqueness, vibrancy, inheritability, and territoriality. China has made remarkable progress in protecting and inheriting intangible culture, achieving results that are widely recognized globally. Government departments have placed great emphasis on the protection of intangible culture and have formulated a series of policies and measures to support these efforts.

Transforming the symbols or content of intangible cultural heritage into daily products that people can easily accept is an effective strategy. Branding these products serves as a powerful means of establishing an emotional bond between people and their culture.

Culture plays a central role in shaping emotional and cognitive experiences. When objects represent typical archetypes of a culture, they create a strong emotional connection between the product and the user. This study explores the relationship between intangible cultural heritage, product branding, and packaging design through the lens of "emotional design." It also integrates design practice and theoretical research by focusing on a regional intangible cultural heritage—Sichuan shadow puppets.

1.2 Introduction of Sichuan Characteristic Intangible Cultural Heritage —Shadow Play

Chinese traditional shadow play has a history of more than 2,000 years and is a brilliant art form that combines exquisite craftsmanship with folk drama. In 2011, it was included in the Representative List of the Intangible Cultural Heritage of Humanity. As a world intangible cultural heritage, Chinese shadow play is widely regarded as a traditional method of teaching and entertainment, expressing the beliefs and customs of Chinese history, society, and culture through interactive performances. Among them, Sichuan shadow play represents a local traditional drama

of Sichuan Province and is one of China's national intangible cultural heritage items.

The art of Sichuan shadow play incorporates elements from Shu brocade, Shu embroidery, folk paper-cutting, and local opera, forming a unique artistic style that reflects the customs, social characteristics, and cultural traditions of the Sichuan region.

In traditional shadow puppetry, the audience in front of the curtain sees the shadows of two-dimensional figures made from beautifully carved animal skins. During the performance, artists behind the white screen manipulate the puppets using sticks tied to the characters while singing stories in local popular tunes, accompanied by percussion instruments and strings, evoking a strong rural atmosphere (Figure 1).

Figure 1: The author filmed the shadow theater performance on his own.

The audience interacts with the shadow puppets through their senses and enjoys a cross-media experience. However, with the development of film, television, and computer games, shadow play has gradually faded out of people's lives and now faces the risk of being forgotten. Based on this, it is essential to explore new paths to protect the art of shadow play.

The success of efforts to protect Chinese shadow play depends on the extent to which in-

novative designs can attract people, provide a positive experience, and increase their immersion in the cultural content of Chinese shadow play. Based on the concept of emotional design, it is particularly important to integrate the cultural elements of shadow play with specific products. The design carrier selected in this study is the brand packaging design of agricultural products.

2 Agricultural Products Brand Packaging Interface

2.1 The Meaning of Agricultural Product Brand Packaging Design

China has a wide variety of agricultural products, which are closely related to regional environments, climates, and local customs. Characteristic agricultural products are those produced under specific natural ecological and technical conditions, such as soil and light, with distinct regional characteristics. Generally speaking, regional agricultural products reflect the unique influence of long-term natural and cultural factors on a particular area.

To create distinctive packaging for agricultural products, it is necessary to creatively combine brand packaging with regional traditional culture, aesthetics, and other cultural elements. Brand packaging design also serves as a carrier for the communication of regional culture.

Authors can insert tables using the MS Word option (**Insert** → **Table**) and specifying the required number of rows and columns. Every table must have a caption (title) positioned above it, and the caption must have the *TableCaption* style applied. Please note that tables should not be supplied as image files. However, if tables are presented as images, they must have the *Image* style applied.

As an example, Table 1 shows all the styles available in this template, which should be applied to the respective elements of your text.

Table 1: Styles Available in the Template

Element	**Style Name**
Title	TitleStyle
Subtitle	SubtitleStyle
Caption for Figures	FigureCaption
Caption for Tables	TableCaption

2.2 Analysis and Design Strategy of Agricultural Products Brand Packaging

At present, the packaging design of agricultural products in China is trapped in the mire of homogenization. Due to the natural attributes of agriculture and its unique characteristics, most agricultural product enterprises in China have not established a strong sense of brand marketing. Taking Sichuan Province as an example, many rural areas with inconvenient transportation and remote locations, despite having high-quality agricultural products, have not developed brand marketing awareness. The packaging design of agricultural products has been neglected, with rough packaging—or even no packaging at all—being a common phenomenon.

Currently, the packaging design of many featured agricultural products on the market tends to follow two extremes: it is either overly luxurious or too rudimentary, lacking any sense of design. Some packaging is excessively extravagant, focusing on a glamorous appearance that initially impresses consumers but ultimately disappoints or disgusts them due to the product's quality. Conversely, some agricultural products are of excellent quality but suffer from poorly designed packaging, with chaotic text and patterns, making it hard to create a visual impact or add value to the product.

To address these issues, it is crucial to explore regional traditional cultural characteristics and integrate them into the packaging design of agricultural products. On the one hand, this highlights the unique regional culture and historical heritage, and on the other hand, it enhances consumers' awareness and desire to purchase these products. Agricultural product packaging should not only emphasize regional characteristics but also incorporate modern green design concepts. This approach improves the overall quality of agricultural products while shaping a distinctive brand image.

Currently, consumers increasingly seek cultural concepts and values in agricultural products. In the packaging design process, designers can integrate local cultural and historical elements into the branding of agricultural products. By transforming these elements into a part of the brand culture, designers can enrich the cultural connotation of the agricultural product brand, making it more comprehensive. This helps enhance the brand culture and awareness of regional agricultural products, ultimately boosting their market competitiveness.

It is both essential and practical to leverage generative artificial intelligence (AIGC) technology to assist in the packaging design of agricultural products. In traditional packaging illustration design, designers often require a high level of artistic skill and spend significant time and resources to refine their creations. This leads to high costs and relatively fixed design styles, which struggle to meet ever-changing design needs. However, generative artificial intelligence offers rapid image processing and high efficiency, significantly improving design productivity and adaptability to diverse design requirements.

3 The Packaging Design of Agricultural Products In Sichuan Province in the Context of Intangible Culture

3.1 Basic Concept of AIGC and Its Development

AIGC (AI-generated content) is a revolutionary method of content production that automatically or semi-automatically creates new content, including text, images, music, videos, and other forms. The core of AIGC is to transform the relationship between human-computer interaction, enabling users to collaborate with machines through natural language and significantly improving efficiency.

AIGC technology has demonstrated vast potential in various fields. For instance, in content creation, AIGC technology helps creators quickly generate high-quality content. In areas such

as personalized recommendations and intelligent customer service, it offers more tailored services and enhances user experiences. As technology continues to advance, the application scenarios for AIGC are constantly expanding. Content, including text, images, audio, and video, can now be automatically generated through AIGC technology. This not only improves content production efficiency but also lowers the barriers and costs associated with content creation.

Moreover, AIGC technology plays a vital role in enhancing the quality and diversity of content. It aids creators in capturing inspiration, innovating interaction formats, and achieving personalized content generation, thereby opening new possibilities in creative and commercial applications.

3.2 AIGC enables the packaging design process of agricultural products in the context of intangible culture

3.2.1 Design Elements Extracted from Sichuan Shadow Play

The innovative design elements of intangible cultural heritage are primarily derived from intangible cultural heritage products, including both ancient and existing items. These elements include features such as appearance modeling, decorative patterns, composition forms, and color applications. The author conducted extensive research by reviewing relevant literature, visiting museums, and conducting field examinations. At the Sichuan Shadow Play Workshop, a large number of real objects, pictures, documents, and other materials containing innovative design elements of shadow play were collected, screened, and organized. These materials were primarily categorized into original shadow play items and shadow play derivative cultural and creative products for analysis.

Subsequently, relevant elements were selected and reconstructed. The role modeling and scene design in shadow play belong to the realm of Chinese folk art, characterized by a unique artistic style within traditional national art. The costume modeling designs and facial makeup imagery in shadow play are vivid, exaggerated, and humorous. Due to the diversity of shadow puppet imagery, selecting appropriate design elements is particularly important. The primary elements include colors, characters, and modeling characteristics, which must be carefully chosen and adapted into the design to achieve the desired style.

3.2.2 Use Artificial Intelligence Tools for Raw Drawing

This study primarily utilizes AI tools such as MidJourney and the domestic Qiyu AI. MidJourney is a painting tool based on artificial intelligence technology. It employs an image generation language model trained and iterated through human feedback reinforcement, innovating the way images are generated. Using historical data and design rules, MidJourney can quickly analyze user and design needs, generate high-quality design solutions, and help designers efficiently find optimal solutions. To a certain extent, it can also stimulate designers' creativity or provide design suggestions that differ from traditional thinking.

MidJourney can automatically generate relevant graphics or design schemes based on simple

user-provided descriptions, significantly reducing time and workload. Additionally, MidJourney features an intuitive and easy-to-use interface, allowing designers to focus on their creative process. In its dialog box, commonly used commands include `/imagine`, `/blend`, and `/describe`. Among these, the `/imagine` command is the primary instruction for generating images. It supports two modes of generation: text-based and graph-based.

Before using Midjourney, it is essential to determine the subject, which in this case is the shadow play image. The material description for the subject includes phrases such as: *"Front view, old man and child, happy atmosphere, white background, traditional Chinese shadow puppetry, Chinese shadow play, Peking shadow play, intricate shadow puppets, traditional Chinese culture, shadow puppet theater, illuminated screen, delicate paper cut figures, vibrant colors, historical Chinese folklore, traditional costumes, performing arts, shadow puppets in motion, detailed craftsmanship, cultural heritage"*. Using this description, relevant images can be generated (Figure 2).

Figure 2: Images generated by the author using the Midjourney platform

When generating an image in MidJourney, the options "U" and "V" appear below the generated image.

- **"U" (Upscale)**: This option allows "single image amplification," where `U1` to `U4` represent different magnification levels. The larger the value, the higher the magnification. If the image generated by the drawing command is suitable, users can click on the desired `U1` to `U4` option to upscale the selected image.

- "**V" (Variation)**: This option provides an "extended version" of the image. `V1` to `V4` represent different ways of making variations, with higher values leading to more diverse changes. If none of the four images are entirely suitable but one has a style or shape that aligns with the user's preferences, the corresponding `V1` to `V4` option can be selected to perform an extension design based on that image.

In addition, a "Regenerate" button is located to the right of the `U4` option. Clicking this button executes a command to regenerate the image, creating a new set of images based on the same input description.

You can also generate an image using a graph as input. First, drag a picture into the MidJourney page. After obtaining the picture link, copy the link. Then, select the instruction `/imagine prompt` on the interface and paste the image link after it. Add a descriptor following the link, for example: *"A small monkey, in traditional Chinese shadow puppetry style, with bright colors, holding a peach –i w1.5."*

Based on the generated plots, you can use the following commands to optimize the drawing:

- **`Vary (Strong)`**: Regenerate a new drawing with significant changes based on the original diagram.
- **`Vary (Subtle)`**: Regenerate a new drawing with minor changes, keeping the overall structure intact.
- **`Vary (Region)`**: Specify a particular area to modify by entering a change instruction, and redraw the specified region of the picture.

Figure 3 provides an example of this process.

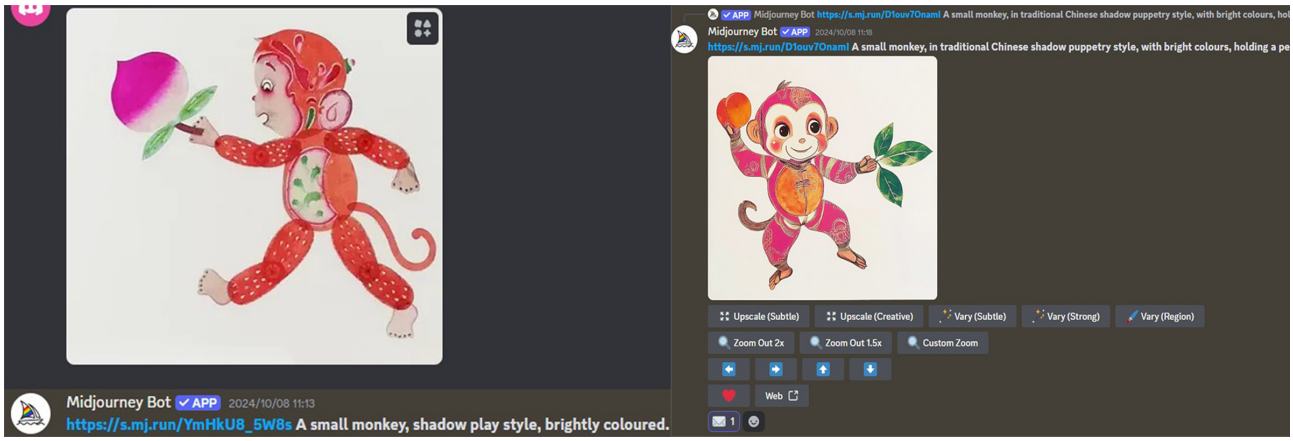

Figure 3: Graph generation operation based on the original graph

China's original AIGC image generation platform, Qiyu AI, is another excellent platform, particularly suitable for generating traditional Chinese-style graphics. Its basic operating principles are similar to those of MidJourney, allowing the generation of images based on prompt words. It supports both text-to-image and image-to-image generation.

For example, prompts like:

"*Shadow puppetry, shadow mural, oriental aesthetics, ancient background, strong visual impact, multi-player melee scenes, Lu Bu holding a square heavenly painting halberd riding a horse, Dunhuang frescoes, the Mountain of Flowers and Fruits, auspicious clouds, golden calligraphic characters, giant trees in the sky, shaped flower sand grasses, three-dimensional particles, dark watercolors, octane rendering, graphic illustrations, central luminescence, contour light, biological luminescence, volume light, volumetric light, masterpiece, high quality, ultra clear*"

can be used to generate traditional Chinese-style images with rich visual elements (as shown).

Additionally, Qiyu AI allows for combining product characteristics into prompts. For example, entering relevant prompt words like:

"*Master painting, highest quality, shadow play, stage, peasant farming, harvest joy, movie footage, film grain*"

can generate customized visuals related to specific themes or product features (Figure 4).

Figure 4: Utilizing the Chinese-made artificial intelligence platform Qiyu AI Produced images

3.2.3 Generate the Pictures and Combine Them with the Packaging of Agricultural Products

In the information age, visual symbols are widely used in daily life, aligning closely with modern public aesthetics. People exhibit a high acceptance of symbolic information, allowing different

symbols to be utilized in design to convey diverse styles. Intangible cultural heritage, as a unique cultural symbol, can be refined and displayed to enhance the aesthetic characteristics of products.

In the process of extracting shadow play elements from AIGC, the primary elements are identified and integrated with packaging design to form a complete packaging style for agricultural products. From the perspective of narrative science, presenting intangible cultural heritage elements on agricultural product packaging constructs a situational narrative. Through visual communication, audiences can intuitively perceive the storytelling conveyed by the packaging.

Historically, visual narrative is one of the oldest forms of storytelling. Ancient humans used ropes, murals, and ritualistic dances to convey messages. In modern times, visual narrative remains a crucial method for understanding and interacting with the world, as well as an important medium for daily communication. The narrative technique of illustration can make agricultural product packaging more vibrant. The cultural heritage stories embedded within the designs enhance the historical and cultural value of the products, fostering goodwill and trust among consumers and thereby increasing the product's added value.

To some extent, intangible cultural heritage and agricultural products share a deep connection to the specific temperament of their regions, reflecting the habits and traditions of their respective communities. Shadow play elements, with their inherent narrative qualities, contribute to this connection. Combining these elements with packaging design offers audiences a sense of immersion in the cultural context of the products. This approach strengthens regional cultural identity and bridges the gap between consumers and the products.

The final design of the agricultural product packaging is illustrated in Figure 5.

Figure 5: Produce packaging graphics designed by the authors themselves using artificial intelligence

4 Conclusions

With the rapid development of AI technology, AI ethics has emerged as a critical research field. It involves the ethical evaluation of emerging AI applications and addresses the new ethical challenges brought about by the advent of AI. Similar to critical theory, AI fundamentally focuses on the liberation and empowerment of humans. However, new issues often arise in the process of assisting humans in solving their problems.

Taking generative artificial intelligence (AIGC) as an example, critical theory observes that, in many cases, AI-generated images may fail to accurately convey the author's ideas, appear overly abstract, or even generate inappropriate content. These issues can significantly impact the efficiency and creative processes of designers.

Nonetheless, AIGC technology offers significant advantages in improving design efficiency and reducing costs. AIGC enables designers to free themselves from repetitive tasks and focus on higher-level creativity and design iterations. In the digital transformation of intangible cultural heritage design from the perspective of AIGC, the demand for talent has fundamentally changed. In packaging design, the application of AI generation technology simplifies processes, enhances design outcomes, and improves design expression.

Against the backdrop of China's rural revitalization, the vast countryside should seize this opportunity. By integrating urban and rural resources, developing distinctive agricultural products, and strengthening the packaging design of these products, local communities can promote their unique agricultural offerings more effectively. Regional intangible cultural heritage elements serve as valuable cultural resources that can play a significant role in this process.

Fund

The source of funding for this study includes the Key Research Base of Humanities and Social Sciences of the Sichuan Provincial Education Department under the Sichuan Agricultural Characteristics Brand Development and Communication Research Centre Project (Item No. 2209). Additionally, the study is funded by the Nanchong City Social Science Research "14th Five-Year Plan" 2024 Annual Project (Item No. NC24B054).

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