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Re-design Requirements Research for Intangible Cultural Heritage Products in the Tourism Industry: A Case Study of Mianzhu New Year Picture

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Abstract

In response to the challenges faced by Mianzhu New Year picture, a national-level intangible cultural heritage in China, in the transformation of tourism, including issues of homogenization, lack of cultural content, and limited innovation, this study aims to optimize the design of tourism derivative products of Mianzhu New Year picture. The goal is to avoid issues that may impact tourism consumption and cultural development. To achieve this, a method for evaluating the redesign requirements of Mianzhu New Year picture tourism products based on the KANO-AHP hybrid model is proposed, with the intention of providing guidance for the development of derivative products of intangible cultural heritage.Focusing on the "cultural creative products" in the redesign of Mianzhu New Year picture tourism products, the KANO model is applied. Based on tourism marketing demands, the study focuses on three main intentions: enhancing tourism consumption, cultural communication, and artistic innovation of Mianzhu New Year pictures tourism products. These are further subdivided into specific contents of artistry, functionality, technology, safety, and culture. A total of 30 requirement indicators are identified, and their KANO requirement attributes are determined. The study then constructs requirements indicators for cultural creative products of Mianzhu New Year picture tourism through statistical analysis. Subsequently, the Analytic Hierarchy Process (AHP) is applied to determine the weights of the cultural creative product requirements indicators. By analyzing and organizing the comprehensive weights of the top 10 requirement indicators, an optimized solution for the redesign of Mianzhu New Year pictures tourism products is obtained.

Keywords: *Mianzhu New Year Picture, Tourism Product Redesign, Cultural Creativity, KANO-AHP Model, Requirement Indicators.*

INTRODUCTION

New Year Pictures, a traditional form of folk painting in China, are created through woodblock carving, printing, or hand painting on paper. Mianzhu New Year Picture, originating from Mianzhu County in Sichuan Province, China, is an ancient folk painting ranked among the "Four Famous New Year Pictures" in China (Figure 1). Integrating skills such as painting, carving, and printing, it is a traditional craftwork associated with the Chinese New Year, often displayed on doors or walls to ward off evil spirits and invoke blessings.In 2006, Mianzhu New Year Picture was listed in the first batch of China's national intangible cultural heritage (China Intangible Cultural Heritage website: https://www.ihchina.cn/, 2022). Distinguishing itself from other Chinese New Year pictures, Mianzhu New Year Picture features meticulous hand-painted details with only the outlines being carved. The craftsmanship is emphasized, resulting in a highly decorative effect in the images (Figure 2). The thematic content of Mianzhu New Year Picture is rich, with each figure and object carrying symbolic meanings and cultural backgrounds, reflecting diverse elements of traditional Chinese culture. Therefore, Mianzhu New Year Picture holds significant research value in terms of culture, history, society, and art. It stands as a representative example of China's intangible cultural heritage.

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Fig.1 Mianzhu New Year Picture 'Door Gods'

Wang, C., & Wang, H. (2012). New Year pictures . Culture and art publishing house.

Fig. 2 Mianzhu New Year Painting Production Process (Partial)

Xie, C. (2011). *The whole process of making colorful Chinese traditional Mianzhu New Year painting.* Sichuan Fine Arts Publishing House.

In the context of the global trend of economic integration, intangible cultural heritage is not only advancing but also facing significant challenges. The transformation and development of intangible cultural heritage have become a key concern in the 21st century. The interaction and integration of intangible cultural heritage with modernity are essential for realizing its heritage value in the present and future. Culture and tourism are intertwined, with culture being the soul of tourism and tourism serving as the carrier of cultural development. The integration of intangible cultural heritage into the tourism industry, coupled with innovative

transformations that align with contemporary consumer demands, holds great potential for development (Folasayo Enoch Olalere, 2019). In 2006, Xiaode Town in Mianzhu, Sichuan Province, the birthplace of Mianzhu New Year Painting, was transformed into a "New Year Painting Village." With a core area of 1,750 acres, the village established New Year Painting workshops, evolving into a premium rural cultural tourism area combining countryside tourism, commodity production, and processing base construction in line with the new rural construction. On April 19, 2011, it was awarded the title of "National AAAA-level Tourist Attraction" by the Chinese Ministry of Culture and Tourism. However, the development of tourism products in Mianzhu New Year Painting Village has not been satisfactory. The progress has been slow, and the current state of New Year Painting tourism products reflects a lag in development. Innovative and distinctive commemorative products related to Mianzhu New Year Painting are lacking. The existing tourism products exhibit homogeneity with those of other places, lacking contemporary appeal, artistic effectiveness, and cultural depth, making it challenging to meet the diverse demands of today's tourists (Jiang, Zhang, & Jiang, 2021).

This research examined the challenges faced by Mianzhu New Year picture, a national intangible cultural heritage in China, in its tourism transformation. Issues such as product homogenisation, lack of cultural depth, and limited innovation were identified in its tourism products. In order to further enhance the design effectiveness of Mianzhu New Year picture's tourism derivative products and to prevent issues affecting tourism consumption and cultural development, a method for evaluating the redesign requirements of Mianzhu New Year picture tourism products was proposed. This method is based on the KANO-AHP hybrid model(Neira-Rodado et al., 2020). and aims to provide guidance for the development of derivative products related to intangible cultural heritage.

The study focused on the optimization requirements of Mianzhu New Year picture tourism products. The KANO model was applied, specifically targeting the tourism industry in Mianzhu New Year picture village. The focus was on three main objectives: enhancing tourism consumption, cultural dissemination, and artistic innovation of Mianzhu New Year picture tourism products. These objectives were further divided into specific aspects such as artistic, functional, technological, safety, and cultural attributes. Initially, a total of 30 requirement indicators were identified, statistically analyzed, and categorized according to their KANO requirement attributes（Cheng et al.，2019）. The study constructed redesign requirement indicators for Mianzhu New Year picture tourism products. Building upon this, the Analytic Hierarchy Process (AHP) was further employed to determine the weights of the tourism product requirement indicators（Cho，2010）.

By analyzing and summarizing the requirement indicators with comprehensive weights within the top 12 positions, an optimized solution for the redesign of Mianzhu New Year picture tourism products was obtained. Finally, based on this foundation, product development and design were carried out, culminating in design validation.

METHODOLOGY

Framework

This study combines the Kano model and AHP for evaluation, establishing a comprehensive and viable model for redesigning Mianzhu New Year picture tourism products. Using AHP to determine user demand weights within the Kano model addresses shortcomings in traditional weight calculations (Wei, Feng;Zhao, 2022). This enhances the KANO model's research analysis of the requirements for redesigning Mianzhu New Year picture tourism products. The study filters these demand attributes, constructs a KANO requirement indicator evaluation system for tourism product redesign, and employs AHP to design a questionnaire, evaluated jointly by experts. The weights of each demand indicator for New Year picture tourism products are calculated and ranked comprehensively, identifying key improvement areas for the redesign. Model Flowchart, as shown in figure 3.

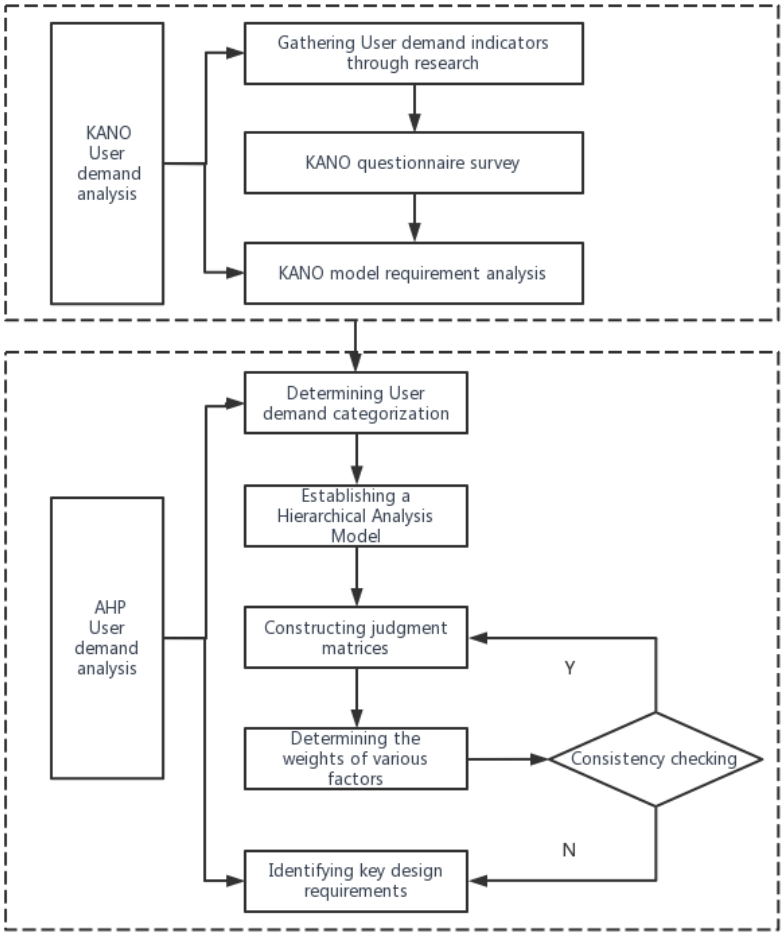

Fig.3 Model flow chart of KANO/AHP

METHOD

2KANO Demand Design Approach

A KANO questionnaire for redesigning Mianzhu New Year picture tourism products was designed to conduct surveys among users, including tourists. A substantial number of questionnaires were collected, and the raw data obtained were processed. Calculations were performed to determine the KA, KO, KM, and KI values for each requirement indicator (Table 1). Based on the results of the KANO analysis, user demands for must-be quality, one-dimensional quality, and attractive quality were identified. User demands categorized as indifferent quality and reverse quality were excluded. This process led to the construction of an evaluation system for the redesign requirements of Mianzhu New Year picture tourism products.

Tab.1 Index of KANO model

Indicator	Meaning	Calculation Formula
K_A: Represents attractive requirements, with higher values indicating greater attractiveness of the requirements。	M represents the frequency of essential requirements, O represents the frequency of expected requirements,	$K_A = \frac{A}{A+O+M+I}$,
K_O: Represents expected requirements, with higher values indicating greater expected		

demand.	A represents the frequency of attractive requirements, I represent the frequency of indifferent requirements.	$K_O = \frac{O}{A+O+M+I}$,
K_M ： Represents essential requirements, with higher values indicating greater essential demand.		$K_M = \frac{M}{A+O+M+I}$
K_I ： Represents indifferent requirements, which are attributes that can be eliminated.		$K_I = \frac{I}{A+O+M+I}$

Constructing and analyzing the quality indicator attributes of Mianzhu New Year Pictures tourism products, seven indifferent qualities that do not affect user satisfaction were removed, leaving 23 indicators under the categories of must-be, one-dimensional, and attractive qualities to form the KANO demand indicator evaluation system for tourism products, as shown in table 2.

Tab.2 KANO demand indexes of tourist souvenirs

KANO classification	Index
Attractive Quality (A)	Innovative craftsmanship
	Digital 3D printing
	Digital Dynamic Process
	2D modeling
	3D modeling
	Integrating products from other eras
	Interactive experience function
	Customizable design
Indifferent Quality(I)	Traditional New Year Picture Materials
	Traditional New Year Picture Craft
	Innovative materials
	Historical Story Theme
	Integrating multicultural themes
	Practical use in daily life
	Educational guidance function
Must-be Quality (M)	Traditional New Year Picture Colors
	Traditional New Year Picture Graphics
	Regional Folk Theme
	Mythological and Legendary Theme
	Environmentally friendly and non-toxic

	Commemorative significance
One-dimensional Quality(O)	Innovative Colors
	Innovative graphics
	Virtual imaging technology
	Integrating other intangible cultural heritage products
	Decorative display
	Office Etiquette
	Fun entertainment function
	High cost-effectiveness
	Convenient and easy to transport

AHP Weight Design Approach

The Analytic Hierarchy Process (AHP) can be divided into four steps: ① Problem hierarchy, constructing a multi-level structure model; ② Constructing judgment matrices for influencing factors; ③ Calculating weight vectors and performing consistency checks; ④ Calculating combined weight vectors and conducting combined consistency checks. In this study, hierarchical division was conducted according to the AHP method. The optimal design solution for redesigning Mianzhu New Year picture tourism products was set as the target level, with must-be quality, one-dimensional quality, and attractive quality as criteria levels. User demand indicators for various attributes were expanded to corresponding sub-criteria levels, constructing the Analytic Hierarchy Process model (Hillier et al., n.d.). As shown in figure 4.

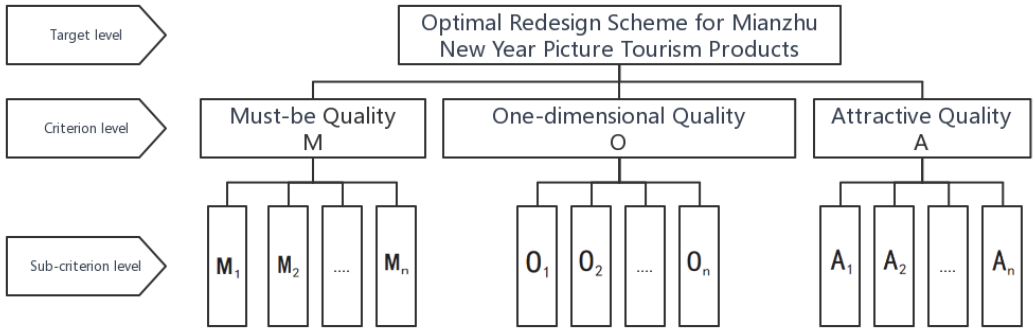

Fig.4 Hierarchical analysis model

The multi-level hierarchical structure model is divided into several levels from top to bottom based on the different attributes of relevant factors. Factors at the same level are subordinate to the factors above or influence the factors above, while they simultaneously dominate the factors below or are influenced by the factors below. The topmost level is the target level, typically having only one factor. The bottom level usually consists of solution or object levels, and there can be one or several intermediate levels, typically criterion or indicator levels. Judgment matrices for various factors are constructed at each level. Once the multi-level hierarchical structure model is established, the relationships between different levels are determined. The judgment matrix represents the pairwise comparisons of the elements within the same level regarding their importance to a

criterion in the level above. The importance judgments are usually quantitatively calculated using a scale from 1 to 9. Weight vectors are computed and a consistency test is conducted (Singh et al., 2020). If the test passes, the normalized characteristic vector becomes the weight vector. Otherwise, it is necessary to reconstruct the pairwise comparison matrix to achieve pairwise consistency ratio.

RESULTS

AHP Questionnaire Survey and Analysis

Focusing on Mianzhu New Year Pictures tourism products, based on the research and analysis coefficients from the KANO questionnaire, the AHP hierarchical analysis method was employed to design the evaluation data table for the requirements indicators of the tourism product redesign（Table 3）. To ensure the objectivity of the weight results of each indicator feature in the AHP model, this evaluation involved 5 experts (Yuan & Jian-min, 2022). Surveys were distributed to the 5 experts, and through in-depth discussions and evaluations, the Delphi Method (Helmer, 1967) was employed. The experts provided scores through questionnaire-based evaluations, and the relative importance of each indicator factor was determined based on the information provided by the experts.

Tab.3 Questionnaire for necessary demand indexes

Please compare the relative importance of the two indicators mentioned in the questionnaire，And hit "√" under the corresponding number										
Index	1	2	3	4	5	6	7	8	9	index
Regional Folk Theme Regional Folk Theme Regional Folk Theme Regional Folk Theme Regional Folk Theme										Traditional New Year Picture Colors Traditional New Year Picture Graphics Mythological and Legendary Theme Environmentally friendly and non-toxic Commemorative significance .....

Experts and scholars assess the importance of elements at each level. Based on their judgments, several judgment matrices are constructed. When determining the weights between factors at different levels, if the results are qualitative, they are often not easily accepted by others. Therefore, Saaty and others proposed the Consistency Matrix Method (Saaty, 1987). Instead of comparing all factors together, it involves pairwise comparisons, using relative scales for these comparisons. Finally, the comparison results undergo consistency checks, aiming to minimize the difficulties of comparing factors with different natures, thus enhancing accuracy. For a specific criterion, various options are compared pairwise, and levels are assigned based on their importance. Table 4 lists the 9 importance levels and their assignments given by Saaty, using the 1-9 scale (Saaty, 1987). Pairwise comparisons are made for the secondary indicators under the essential, expected, and attractive requirements using relative scales to reduce the difficulties of comparing factors with different natures and to improve accuracy. This process helps determine the relative weights between different requirement indicators in the tourism product. The matrices constructed based on these pairwise comparisons are referred to as judgment matrices. The judgment matrix possesses the following properties:

$$a_{ij} = \frac{1}{a_{ji}}$$

The scaling method for the elements of the judgment matrix is as follows:

Tab.4 Notes to the meanings of item 1-9 in the questionnaire

scale	Meaning
1	Indicates that two indicators are equally important compared to each other
3	Compared to two indicators, the former is slightly more important than the latter

5	Compared to two indicators, the former is significantly more important than the latter
7	Indicates that compared to two indicators, the former is more strongly important than the latter
9	Compared to two indicators, the former is extremely important compared to the latter
2,4,6,8	Intermediate value of adjacent judgments mentioned above
count backwards	If the ratio of the importance of factor i to factor j is B (i, j), then the ratio of the importance of factor j to factor i is B=1/B (i, j) (B (i, j)>1, when i=j, B=1)

AHP Weight Calculation

Applying AHP to Evaluate the Requirements for Redesigning Mianzhu New Year Picture Tourism Products，In this study, the square root method was employed to calculate the weight vector. The specific calculation process is as follows:

First, calculate the product of elements in each row of the judgment matrix M_i

$$Mi = \prod_{j=1}^{n} aij \ (i = 1,2,\ldots,n) \qquad (1)$$

And then set the M_i To the nth power, we obtain $\overline{W_i}$：

$$\overline{Wi} = \sqrt[n]{Mi}(i = 1,2,\ldots,n) \qquad (2)$$

Finally, the vector $\overline{W_i}$ Normalized W：

$$Wi = \frac{\overline{Wi}}{\sum_{i=1}^{n}\overline{Wi}}, W = (W_1, W_2, \ldots, W_n)^T \qquad (3)$$

Calculate the maximum eigenvalue and maximum eigenvector of the first level indicator.

Furthermore, the weightings obtained through the Analytic Hierarchy Process need to undergo a consistency check. If the logic behind the construction is unclear, there might be errors in the obtained weightings. An erroneous judgment matrix could even lead to issues in decision-making. Hence, it's essential to employ a Consistency Index (CI) to assess logical consistency, ensuring that the weightings are logically coherent. The larger the CI, the worse the logical consistency of the judgment matrix; conversely, a smaller CI indicates better logical consistency. Additionally, observing the Consistency Ratio (CR) helps determine whether the matrix exhibits consistency. The judgment matrix is considered consistent only if the CR value is less than 0.1. The specific calculation formula is as follows:

$$C.R. = \frac{C.I.}{R.I.} \qquad (4)$$

wherein，

$$C.I. = \frac{\lambda_{\max} - n}{n-1} \qquad (5)$$

$$\lambda_{\max} = \frac{1}{n}\sum_{i=1}^{n}\frac{(AW)_i}{W_i} \qquad (6)$$

Random Index (RI) is a set of average values obtained through random sampling, calculation, and final

determination of the consistency index for random judgment matrices of the same order. The values of RI for different order matrices from 1 to 12 are as Table 5 shows.

Tab. 5 Values of Matrix RI

n	1	2	3	4	5	6	7	8	9	10	11	12
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.53

In general, the smaller the CR value, the better the consistency of the judgment matrix. When CR ≤ 0.1, the consistency of the judgment matrix is considered acceptable. Otherwise, adjustments need to be made to the numerical values of the judgment matrix until consistency is achieved.

Steps for Calculating Feature Values and Indicator Weights

First, calculate the product of each row element in the judgment matrix M_i :

$$M_i = \prod_{j=1}^{n} a_{ij} (i = 1,2,..., n)$$

$$\begin{bmatrix} 1 & 1/2 & 2 \\ 2 & 1 & 3 \\ 1/2 & 1/3 & 1 \end{bmatrix} \longrightarrow \begin{bmatrix} 1.000 \\ 6.000 \\ 0.167 \end{bmatrix}$$

The following lines are calculated using the same method M_i 。

And then set the M_i To the nth power, we obtain $\overline{W_i}$

$$\overline{W_i} = \sqrt[n]{M_i} (i = 1,2,...,n)$$

$$\begin{bmatrix} 1.000 \\ 6.000 \\ 0.167 \end{bmatrix} \longrightarrow \begin{bmatrix} 1.000 \\ 1.817 \\ 0.550 \end{bmatrix}$$

Finally, the vector $\overline{W_i}$ Normalized W , Obtained weight data for these four indicators.

$$W_i = \frac{\overline{W_i}}{\sum_{i=1}^{n} \overline{W_i}} \quad W = (W_1, W_2, ..., W_n)^T$$

$$\begin{bmatrix} 1.000 \\ 1.817 \\ 0.550 \end{bmatrix} \longrightarrow \begin{bmatrix} 0.297 \\ 0.540 \\ 0.163 \end{bmatrix} \longrightarrow W$$

Calculating Eigenvalues, Hierarchical Single Ranking, And Consistency Testing

In correspondence to the maximum eigenvalue $\lambda_{\max}$ of the judgment matrix A, its normalized eigenvector (normalized so that the sum of its elements equals 1) is denoted as W. The elements of W represent the relative

importance weights of the factors within the same hierarchical level concerning a certain factor in the level above, and this process is called hierarchical ranking. To confirm hierarchical ranking, a consistency check is necessary. The consistency check refers to determining the permissible range of inconsistency for the maximum eigenvalue λ. For an n-order consistent matrix, the unique nonzero eigenvalue is n. The maximum eigenvalue λ of an n-order positive reciprocal matrix A, A is a consistent matrix if and only if $\lambda = \mathrm{n}$.

$$\begin{bmatrix} 1-\lambda & 1/2 & 2 \\ 2 & 1-\lambda & 3 \\ 1/2 & 1/3 & 1-\lambda \end{bmatrix} = 0$$

$$\lambda_{\max} = 3.009$$

Calculate Consistency Indicator CI

Due to the continuous dependence of λ, the more values of λ exceed n, the more severe the inconsistency of matrix A. The consistency indicator, CI, is calculated to measure consistency, where a smaller CI indicates greater consistency. The eigenvector corresponding to the maximum eigenvalue is used as the weight vector for comparing factors and assessing their impact on a certain factor in the upper level. A larger degree of inconsistency in this eigenvector leads to greater judgment errors. Therefore, the magnitude of the $\lambda - \mathrm{n}$ value can be used to measure the inconsistency of matrix A.

Therefore, it can be used：

$$CI = \frac{\lambda_{\max} - \mathrm{n}}{\mathrm{n} - 1} = \frac{3.009 \quad -3}{3-1} = 0.005$$

CI=0, with complete consistency; CI is close to 0, with satisfactory consistency; The larger the CI, the more severe the inconsistency.

Calculate Consistency Ratio CR

Considering that the deviation of consistency may be caused by random reasons, it is necessary to compare CI with the random consistency indicator RI to obtain the test coefficient CR when testing whether the judgment matrix has satisfactory consistency. The formula is as follows:

$$CR = \frac{CI}{RI} = \frac{0.005}{0.58} = 0.008$$

Because n is 3, according to the above table, RI=0.58. Generally, if CR<0.1, it is considered that the judgment matrix has passed the consistency test, otherwise it does not have satisfactory consistency. Obviously, CR=0.008<0.1,suggests that the consistency of the first level judgment matrix is acceptable，as the Table 6 shows；Similarly, a survey of the importance of redesigning Mianzhu New Year picture tourism products was conducted through a questionnaire. A comparative matrix was constructed to calculate the weights of all secondary requirements under the essential, expected, and attractive demands in the redesign of tourism products, as the Table 7-9 shows.

Tab.6 Weights of level one demand indexes of tourist souvenirs

First level	Attractive Quality	Must-be Quality	One-dimensional Quality	weight	Maximum characteristic root	CI	CR
Attractive Quality	1	1/2	2	0.297	3.009	0.005	0.008
Must-be Quality	2	1	3	0.540			
One-dimensional Quality	1/2	1/3	1	0.163			

Tab.7 Weights of second level indexes subordinated to Attractive Quality indexes of tourist souvenirs

	3D modeling	Customizable design	Interactive experience function	Innovative craftsmanship	Digital 3D printing	Integrating products from other eras	2D modeling	Digital Dynamic Process	weight	Maximum characteristic root	CI	CR
3D modeling	1	4	2	1	3	2	5	4	0.245	8.909	0.130	0.092
Customizable design	1/4	1	1/3	1/5	1/5	2	1	1/3	0.048			
Interactive experience function	1/2	3	1	1/2	1/2	2	4	2	0.130			
Innovative craftsmanship	1	5	2	1	1/4	2	1	1	0.127			
Digital 3D printing	1/3	5	2	4	1	5	4	4	0.248			
Integrating products from other eras	1/2	1/2	1/2	1/2	1/5	1	1	1/3	0.052			
2D modeling	1/5	1	1/4	1	1/4	1	1	1	0.060			
Digital Dynamic Process	1/4	3	1/2	1	1/4	3	1	1	0.089			

Tab.8 Weights of second level indexes subordinated to Must-be Quality indexes of tourist souvenirs

	Traditional New Year Picture Colors	Traditional New Year Picture Graphics	Regional Folk Theme	Mythological and Legendary Theme	Environmentally friendly and non-toxic	Commemorative significance	weight	Maximum characteristic root	CI	CR
Traditional New Year Picture Colors	1	1	1	3	1	3	0.227	6.296	0.059	0.048
Traditional New Year Picture Graphics	1	1	1	3	2	1	0.212			
Regional Folk Theme	1	1	1	2	1	1	0.177			
Mythological and Legendary Theme	1/3	1/3	1/2	1	1/2	1	0.087			
Environmentally friendly and non-toxic	1	1/2	1	2	1	3	0.189			
Commemorative significance	1/3	1	1	1	1/3	1	0.109			

Tab.9 Weights of second level indexes subordinated to One-dimensional Quality indexes of tourist souvenirs

	Decorative display	Virtual imaging technology	Convenient and easy to transport	Innovative graphics	Fun entertainment function	Innovative Colors	Office Etiquette	High cost-effectiveness	Integrating other intangible cultural heritage products	weight	Maximum characteristic root	CI	CR
Decorative display	1	3	3	1/3	1	1	1	2	1	0.125	10.037	0.130	0.089
Virtual imaging technology	1/3	1	2	1/3	1/2	1/3	1	1/3	1/2	0.058			
Convenient and easy to transport	1/3	1/2	1	1/3	2	2	1	1/3	1/2	0.071			
Innovative graphics	3	3	3	1	3	2	2	2	1	0.210			
Fun entertainment function	1	2	1/2	1/3	1	1/3	1	1/2	1/3	0.066			
Innovative Colors	1	3	1/2	1/2	3	1	2	1	1	0.121			
Office Etiquette	1	1	1	1/2	1	1/2	1	3	1/3	0.088			
High cost-effectiveness	1/2	3	3	1/2	2	1	1/3	1	1/2	0.099			
Integrating other intangible cultural heritage products	1	2	2	1	3	1	3	2	1	0.164			

Overall Weighted Ranking

Overall Ranking of the Hierarchical Structure of Redesign Requirements for Mianzhu New Year Picture Tourism Products. Overall ranking involves calculating the product of each secondary requirement index for Mianzhu New Year Picture tourism product redesign and its corresponding primary index requirement. This process determines the comprehensive weight of the 23 secondary indices in the entire tourism product requirement system. It signifies the impact and importance of each secondary requirement index on user satisfaction. As shown in table

Tab.10 Second level demand indexes of tourist souvenirs

First level	First level indicator weight	Secondary indicators	Secondary indicator weight	Comprehensive weight of secondary demand indicators	Comprehensive weight sorting
A	0.297	3D modeling	0.245	0.073	6
		Customizable design	0.048	0.014	19
		Interactive experience function	0.130	0.039	9
		Innovative craftsmanship	0.127	0.038	10
		Digital 3D printing	0.248	0.074	5
		Integrating products from other eras	0.052	0.016	18
		2D modeling	0.060	0.018	16
		Digital Dynamic Process	0.089	0.026	13
M	0.540	Traditional New Year Picture Colors	0.227	0.122	1
		Traditional New Year Picture Graphics	0.212	0.114	2
		Regional Folk Theme	0.177	0.095	4
		Mythological and Legendary Theme	0.087	0.047	8
		Environmentally friendly and non-toxic	0.189	0.102	3
		Commemorative significance	0.109	0.059	7
O	0.163	Decorative display	0.125	0.020	14
		Virtual imaging technology	0.058	0.009	23
		Convenient and easy to transport	0.071	0.012	21
		Innovative graphics	0.210	0.034	11
		Fun entertainment function	0.066	0.011	22
		Innovative Colors	0.121	0.020	15
		Office Etiquette	0.088	0.014	20
		High cost-effectiveness	0.099	0.016	17
		Integrating other intangible cultural heritage products	0.164	0.027	12

From the statistical data in Table 10, it can be observed that the comprehensive weights of the secondary demand indicators for the redesign of Mianzhu Mianzhu New Year picture tourism products, from low to high, are as follows: traditional Mianzhu New Year picture colors, traditional Mianzhu New Year picture graphics, environmentally friendly and non-toxic features, regional folk theme, digital 3D printing, three-dimensional

modeling, commemorative significance, mythological and legendary theme, interactive experience function, innovative craftsmanship, innovative graphics, integration with other intangible cultural heritage products, digital dynamic process, display and decorative features, innovative colors, two-dimensional modeling, high cost-effectiveness, integration with products from other eras, customizable design, office etiquette, convenient and easy transportation, fun entertainment function, and virtual imaging technology.

Analyzing the comprehensive weight ranking of the secondary demand indicators, it is determined that: the weight of must-be quality indicators predominates over attractive quality indicators, while the comprehensive weight of attractive quality indicators generally surpasses that of one-dimensional quality indicators, though with marginal differences. The overall demands align with the research objectives.

DISCUSSION

Through the analysis of the comprehensive weight data of the secondary demand indicators for the redesign of Mianzhu tourism products, it is evident that the weight data for the must-be requirements are consistently higher than those for the attractive and one-dimensional requirements. Specifically, six essential indicators, namely traditional Mianzhu New Year picture colors, traditional Mianzhu New Year picture graphics, regional folk theme, mythological theme, environmentally friendly and non-toxic features, and commemorative significance, stand out. These indicators should be emphasized as fundamental design criteria.

Simultaneously, in order to clearly present the impact of demands on user satisfaction between expected and attractive attributes, the attractive demands and expected demands were integrated for comprehensive prioritization. With support from research data and considering the actual context of Mianzhu Mianzhu New Year picture tourism product development, a decision was made through expert discussions to optimize the product redesign based on the top 12 requirements from Table 16, primarily focusing on traditional Mianzhu New Year picture attributes. These 12 indicators consist of 6 must-be requirements, 4 attractive requirements, and 2 one-dimensional requirements, specifically including traditional Mianzhu New Year picture colors, traditional Mianzhu New Year picture graphics, environmentally friendly and non-toxic features, regional folk theme, digital 3D printing, three-dimensional modeling, commemorative significance, mythological theme, interactive experience function, innovative craftsmanship, innovative graphics, integration with other intangible cultural heritage products, and digital dynamic processes.

Therefore, the optimized strategy for Mianzhu New Year Picture tourism products is as follows:

Preserving the Basic Features of Traditional New Year Pictures. Traditional Mianzhu New Year picture colors, traditional Mianzhu New Year picture graphics, and environmentally friendly and non-toxic features are the top three in the integrated weight ranking of Mianzhu Mianzhu New Year picture tourism product redesign requirements. The analysis is rooted in the recognition of Mianzhu Mianzhu New Year picture's traditional attributes by product users. They believe that the foundation of Mianzhu Mianzhu New Year picture redesign should preserve the inherent elements of Mianzhu Mianzhu New Year picture, fully inheriting its artistic characteristics. Furthermore, in the era of new products, users' awareness of environmental protection and ecological consciousness has intensified. Regardless of the changes and innovations, environmental friendliness and non-toxicity have become pivotal concerns in product design. Therefore, in the redesign of Mianzhu Mianzhu New Year picture tourism products, a deep understanding of Mianzhu Mianzhu New Year picture's graphics and colors is essential. It requires delving into its artistic features, refining design elements, and optimizing the design while preserving the inherent artistic essence of Mianzhu Mianzhu New Year picture. Simultaneously, when selecting materials for the design, attention must be paid to environmental considerations. Incorporating sustainable development and applications in the design materials would be even more beneficial.

Enhancing Cultural Significance and Artistic Quality. The demand for regional folk themes ranks fourth, while commemorative significance ranks seventh, and mythological and legendary themes integrated with other intangible cultural heritage rank twelfth. The demand for regional folk themes reflects the consideration of tourists to avoid the homogenization of intangible cultural heritage tourism products. Moreover, products with commemorative value require special connotations and meanings. Regional folk customs externalize the

experiences of people's lives in each region for centuries. It embodies distinctive local cultural connotations, including different lifestyles and local folk stories. The theme of mythology and legends is an inherent category of Mianzhu Mianzhu New Year picture, containing stories and legends of the Chinese nation. Integrating these culturally rich themes with local Mianzhu Mianzhu New Year picture art is beneficial for creating local tourism products that users identify with, distinguishing them from those of other regions, and possessing greater commemorative value. Integrating local intangible cultural heritage is a way to enhance value and promote cultural exchange. Particularly, incorporating Mianzhu New Year pictures into the promotion of local intangible cultural heritage foods, such as making pastries and packaging, can serve as mutually reinforcing channels for communication and exchange.

Enhancing Modernity and Innovation. The demand for digital 3D printing, three-dimensional modeling, interactive experience functions, innovative craftsmanship, and innovative graphics represents the desires bestowed upon tourism product users by the era. From the perspective of tourism product users, they aspire to preserve the characteristics of traditional culture and inherit outstanding ancient art. Simultaneously, they are eager to explore new design methods to enhance the artistic effect of Mianzhu Mianzhu New Year pictures. These desires are not contradictory.

Therefore, in the redesign process, appropriate graphic creative methods should be employed. While retaining certain graphic features of Mianzhu Mianzhu New Year pictures, innovative graphics should be introduced to better align with contemporary demands. Mianzhu Mianzhu New Year picture's two-dimensional drawings can also leverage digital 3D printing technology to restore forms and create more three-dimensional effects. In innovative craftsmanship, 3D printing technology can replace the woodblock printing process, improving the efficiency of stereotyping. Lastly, interactive gaming features can be incorporated on the basis of three-dimensional structures, enhancing the product's technological appeal.

CONCLUSION

This dissertation focuses on investigating the requirements for redesigning tourism products related to Mianzhu New Year Pictures. A KANO survey questionnaire was designed for this purpose, and on-site investigations were conducted in Mianzhu New Year Picture Village located in Sichuan Province, China. The study aimed to extract demand attributes for tourism product indicators, leading to the construction of a comprehensive evaluation system consisting of 30 indicators for the redesign requirements of Mianzhu New Year Picture tourism products. Utilizing the Analytic Hierarchy Process (AHP), questionnaires were designed and administered to determine the comprehensive weights of demand indicators. Following a thorough ranking process, key indicators requiring focused design and improvement were identified. Ultimately, while preserving the fundamental characteristics of Mianzhu New Year Pictures, the study proposed design solutions to enhance contemporaneity, innovate materials and forms, and enrich cultural connotations. These specific recommendations serve as valuable insights for further Mianzhu New Year Picture tourism product redesign and provide a research framework for the redevelopment of intangible cultural heritage.

REFERENCES

Cheng, Y. S., Kuo, N. Te, Chang, K. C., & Hu, S. M. (2019). Integrating the Kano model and IPA to measure quality of museum interpretation service: a comparison of visitors from Taiwan and Mainland China. Asia Pacific Journal of Tourism Research, 24(6), 483–500. https://doi.org/10.1080/10941665.2019.1591474

Cho, T. (2010). AHP 와 Kano 모델 통합에 의한 Determination of the CTQ of Digital Camera Integrating Kano model & AHP. 359–369.

Helmer, O. (1967). Analysis of the Future: The Delphi Method. RAND Corporation. https://www.rand.org/pubs/papers/P3558.html.

Hillier, F. S., Price, C. C., & Austin, S. F. (n.d.). 76-Models , Methods , Concepts & Applications of the Analytic Hierarchy Process Second Edition (Vol. 175).

Jiang, J., Zhang, J., & Jiang, Y. (2021). Empirical research on tourism commodity development and consumption preference of Mianzhu New Year pictures. Global Journal of Arts, Humanities and Social Sciences. https://eajournals.org

Neira-Rodado, D., Ortíz-Barrios, M., de la Hoz-Escorcia, S., Paggetti, C., Noffrini, L., & Fratea, N. (2020). Smart product design process through the implementation of a fuzzy Kano-AHP-DEMATEL-QFD approach. Applied Sciences (Switzerland), 10(5). https://doi.org/10.3390/app10051792

Olalere, F. E. (2019). Intangible cultural heritage as tourism product: The Malaysia experience. African Journal of Hospitality, Tourism and Leisure, 8(3). Retrieved from https://www.ajhtl.com

Saaty, R. W. (1987). The analytic hierarchy process-what it is and how it is used. Mathematical Modelling, 9(3–5), 161–176. https://doi.org/10.1016/0270-0255(87)90473-8

Singh, R., Avikal, S., Rashmi, R., & Ram, M. (2020). A Kano model, AHP and TOPSIS based approach for selecting the best mobile phone under a fuzzy environment. International Journal of Quality and Reliability Management, 37(6–7), 837–851. https://doi.org/10.1108/IJQRM-01-2020-0022

Wang ming, Z. yuanhong. (2021). On the value and practical path of New Year pictures in the inheritance of rural culture. Technokogy&practice, 2, 12–13. https://doi.org/10.13212/j.cnki.csa.2021.02.005

Wang, C., & Wang, H. (2012). New Year pictures . Culture and art publishing house.www.whyscbs.com

Wei, F., & Zhao, X. (2022). Research on pet cat companion robot design based on Kano and AHP. Design, 35(1), 128-131. http://www.cnki.net

Xie, C. (2011). Xie, C. (2011). The whole process of making colorful Chinese traditional Mianzhu New Year painting. Sichuan Fine Arts Publishing House. http://www.whyscbs.com.