Research on the Experience Requirements of Sanxingdui Cultural and Creative Products Based on Kano Model

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Abstract: *Background:* With the evolution of the times, the focus on the inheritance and innovation of traditional culture has gradually shifted, and a trend of integrating fine traditional culture with cultural and creative products has emerged in the consumer market. The discovery and excavation of the Sanxingdui site have driven the rapid development of the cultural industry centered on Sanxingdui culture, injecting new impetus into the design of cultural and creative products. *Purpose：* This study aims to explore consumers' perceptions and demands for Sanxingdui cultural and creative products, thereby providing targeted suggestions for product design. *Methods:* Literature analysis, case studies, questionnaire surveys, the Kano model, and Better-Worse analysis (coupled with demand attribute classification) were employed to deeply explore and organize data, so as to clarify the internal structure and priority hierarchy of consumer demand. *Results:* Through rigorous analysis of questionnaire data and application of the Kano model, five dimensions of consumer demand were identified, and in-depth user demand analysis was conducted. *Conclusion:* Consumers prioritize experiential value and hold high expectations for the utility of Sanxingdui cultural and creative products. Exploring users' potential needs can effectively improve satisfaction and engagement, while providing novel insights for the design of such products.

Keywords: Kano model; Sanxingdui; Cultural and creative products; Consumer demand; User experience

1.Introduction

1.1 Research Background

The Sanxingdui site is located in Guanghan City, Sichuan Province, China. It marks an important beginning of early archaeological exploration in China, and its discovery fills a gap in the history of early Chinese civilization, providing people with a unique cultural experience. This site not only holds significant historical value but also provides valuable physical materials for studying the diverse and integrated pattern of Chinese civilization (Feng & Li, 2025). The Sanxingdui bronze ritual vessels are the core artifacts used in the ancient Shu ancestors' sacrificial rituals. Their design combines practical functions with spiritual symbols (Wang, 2025a), reflecting artistic beauty through a blend of realism and abstraction, as well as the natural harmony between heaven and humanity, and the symbolic power of divine and royal authority (Hu & Luo, 2025). With their mysterious and unique charm, they have attracted much attention.

As archaeological work progresses, the development of cultural and creative products has become a key factor for cultural communication. Its categories are rich and diverse, and its design concept is deeply rooted in the Sanxingdui culture. Through the integration of new technologies, symbols, and industries, it conveys cultural connotations from multiple perspectives while aligning with modern aesthetics and practical functions. The combination of exploration and innovation not only promotes

economic and industrial progress, supporting local development, but also provides valuable data on user demands and case studies for the transformation of contemporary design. Moreover, it promotes innovative development in academic theory and research methods.

1.2 Research Purpose

The overall objective of this study is to analyze consumers' awareness and demand for Sanxingdui cultural and creative products, identify existing problems, and provide targeted strategies and recommendations. By examining the design and application of Sanxingdui elements in cultural and creative products, as well as conducting an in-depth study of people's priorities and preferences related to these products, we can gain insights into the current application, acceptance, and popularity of traditional cultural elements in modern life. This provides both theoretical support and practical guidance for preserving and innovating Sanxingdui's traditional culture, promoting the effective integration of tradition with modern design, and encouraging the sustainable development of Sanxingdui's cultural and creative industry.

1.3 Research Question

Based on the research objectives, this paper will explore the following three research questions and verify them through a questionnaire survey.

RQ1: How to identify which specific product features correspond to the five Kano model requirements (must-be, performance, excitement, indifferent, and reverse attributes) for consumers of Sanxingdui cultural and creative products?

RQ2: How can the Better-Worse coefficient analysis be used to determine whether the specific features of Sanxingdui cultural and creative products belong to stable and reliable Kano demand categories?

RQ3: Regarding the characteristics of Sanxingdui cultural and creative products categorized into the five Kano model requirements, how can we verify the differences in the impact of different requirement categories on consumers' purchase intentions?

1.4 Research Content

This study follows a series of steps: reviewing literature and writing a review, formulating a survey plan, conducting surveys, analyzing feedback data, proposing rational strategies, and presenting conclusions and prospects. It uses research methods such as literature searches and studies, investigations and analyses, questionnaires and interviews, combined with the KANO model and better-worse coefficients. Starting with the collection and organization of basic data, it conducts field research on Sanxingdui culture, users, and cultural and creative contributors. Through questionnaires covering product satisfaction, industry awareness, and cultural recognition, as well as face-to-face interviews with Sanxingdui cultural and creative consumers, enthusiasts, and developers, user analysis and the organization of Sanxingdui cultural and creative ideas are performed. Subsequently, the collected questionnaires and interview feedback are organized to provide factual evidence for the application of traditional cultural symbols, aiming to create new ideas and a Sanxingdui cultural and creative brand under the theme of "traditional culture and cultural creativity," ultimately forming conclusions and prospects.

1.5 Research Method

This study combines literature analysis, case studies, and questionnaire surveys. Firstly, literature analysis and case studies provide theoretical support. Additionally, a questionnaire survey method included 27 questions that were created using the Wenjuanxing platform, which comprised 23 Kano paired questions that differentiate between functional and non-functional dimensions, as well as reverse questions. A total

of 106 valid questionnaires were collected, representing all age groups, with a 100% response rate. Reliability and validity tests were conducted using SPSS, resulting in an overall Cronbach's α coefficient of 0.966, a KMO value of 0.852, and Bartlett's test of sphericity meeting the standard requirements.

2. Analysis of the Current Design Status of Sanxingdui Cultural and Creative Products

2.1 Market Overview of Sanxingdui Cultural and Creative Products

Cultural and creative products are becoming an integral part of daily life. As shown in Figure 1, the 2024 Cultural and Creative Industry Report indicates that China's cultural industries are demonstrating steady growth, with the stationery sector undergoing significant transformation. Digital technology is accelerating the evolution of traditional stationery concepts, while the expanding market for cultural creative products shows substantial potential.
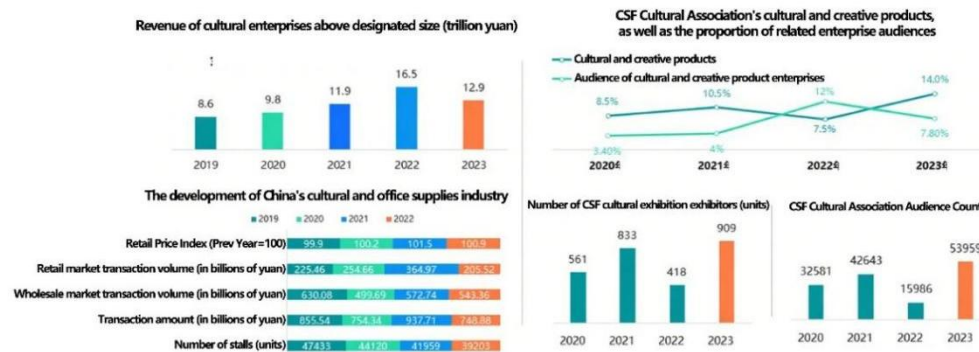

Figure 1: Scale of China's cultural and creative market
Source: National Bureau of Statistics, China Cultural Goods Fair (CSF Cultural Fair), a leading cultural and office goods trading platform in the Asia Pacific region, compiled and illustrated by Mob Research Institute

Among them, the Sanxingdui Museum has strengthened collaboration and co-creation with brands by developing a variety of diversified, multi-type, and multi-level joint brand products. It leverages cultural and creative resources to foster high-quality cultural industry development, establishing a comprehensive chain that encompasses product development, intellectual property licensing, and brand promotion, thereby promoting the overall growth of the cultural and creative industries (Wang, 2025b). According to the Guanghan City Government, Sanxingdui's cultural and creative revenue mainly comes from product sales. The museum currently offers over 2,000 cultural and creative products across 13 categories, including accessories, toys, stationery, handicrafts, textiles, and 3C electronics. These are primarily designed and produced by more than 100 third-party suppliers, with a small number developed independently. Public data shows that cultural and creative revenue reached approximately 100 million yuan in 2023 and increased to about 200 million yuan in 2024, ranking first among museums in the province. Data from Sanxingdui indicates that around 90% of this revenue comes from product sales, with the remainder from IP licensing, catering, and other sources (City Media Center, 2025). Sanxingdui's cultural and creative products have effectively promoted the integrated development of local tourism and manufacturing, generated significant economic and social benefits, and established a successful model in the cultural and creative sector.

2.2 Design Features of Sanxingdui Cultural and Creative Products

1) Creative Product Design Incorporating Traditional Cultural Elements

Cultural and creative design involves extracting and transforming cultural elements to create innovative forms that reflect cultural essence while meeting contemporary market needs (Zhang, 2025). This design approach demonstrates four distinct features: strong integration of tradition and modernity, profound cultural significance, unique visual forms that range from bronze patterns to paper-cut motifs, and diverse material combinations that blend traditional and modern textures.

2) Extension of the Industrial Chain of Traditional Cultural Elements

The product design extending from the traditional cultural industry chain exhibits diverse and notable features. An industrial chain comprises interconnected economic activities (Kui, 2015). The extension of the Sanxingdui cultural industry chain demonstrates the depth and breadth of industrial integration. Design-driven cultural and creative development encompasses a range of categories, such as stationery, accessories, and toys. Meanwhile, advances in exhibition design have facilitated the nationwide tour of the Sanxingdui Ancient Shu Civilization series, broadening its cultural reach (Li, 2025). Stylistically, the products blend traditional charm with modern aesthetics. Functionally, they preserve cultural significance while enhancing practicality. Through these products, traditional culture is widely disseminated. Emphasizing serialization and coherence, designs centered on consistent themes that cater to diverse scenarios and strengthen cultural impact.

3) Cross-border Cooperation of Traditional Cultural Elements

Cross-border products that integrate traditional cultural elements exhibit four key characteristics: integration, combining traditional culture with modern fields like fashion and technology; innovation, presenting heritage through novel approaches; uniqueness, standing out through cultural relic elements with high collectible value; and topicality, attracting social discussion and diverse consumer groups to broaden cultural dissemination. Collaborative marketing can transform traditional culture by implanting historical narratives and intellectual property (IP) features into cross-border products through innovative design. This approach strikes a balance between modern consumer needs and cultural preservation. Such cultural-creative collaborations have become market favorites due to the blending of tradition and modernity (Wang, 2022).
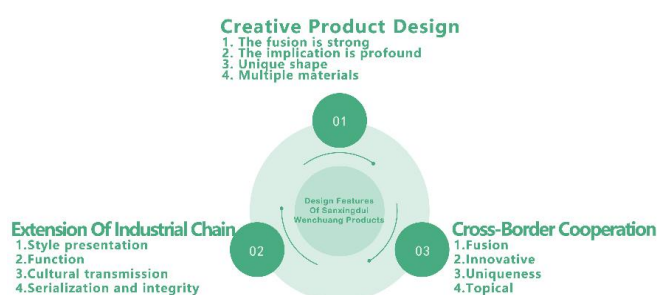

Figure 2: Summary of Design Features of Sanxingdui Cultural and Creative Products

2.3 Existing Problems and Challenges

All types of cultural institutions nationwide recognize the value of cultural and creative products. However, many product designs often lack originality and tend to be homogenized (Su, 2021). Although Sanxingdui cultural and creative products possess a certain uniqueness, some designs still lack innovation (Li, 2007), making it difficult to meet consumers' desires for novelty and personalization. Although the Sanxingdui Museum has established clear quality standards for its cultural and creative products, inconsistencies in product quality persist, which can negatively affect the consumer shopping experience and harm the museum's reputation. This situation may arise from

insufficient supervision during the production process or from some partnering manufacturers compromising quality standards in the pursuit of profit.

The Sanxingdui Museum has relatively low brand awareness in the cultural and creative field compared to other well-known museums (Norman, 2015). This weaker brand recognition can negatively affect product sales and market promotion. In the highly competitive cultural and creative market, a lack of brand influence can make it more challenging to attract consumers and secure market share.

Creativity and design in cultural and creative products are often vulnerable to plagiarism, which leads to significant issues like rampant IP infringement and inconsistent quality in counterfeit products (Hara, 2006). Additionally, cultural and creative enterprises incur high costs for rights protection while receiving low compensation, which diminishes their motivation to protect their rights and severely impacts both the interests of legitimate products and the brand image of Sanxingdui Culture. The cultural and creative industry requires a wealth of creative and design talents (Lovelock & Wirtz, 2010), but the current shortage limits the innovative development of Sanxingdui cultural and creative products. Furthermore, while museum cultural and creative industries have brought new vitality to museums, they still face issues such as insufficient professional talent, single marketing methods, inadequate innovation in distribution channels, and high design costs (Liu, 2023).

Sanxingdui cultural and creative products currently face challenges due to a lack of convenient sales channels, which restricts consumer access and hinders market reach and sales. Moreover, some products fail to explore the more profound cultural connotations of Sanxingdui. Beyond bestsellers from prominent institutions like the National Museum and the Palace Museum, many other museums suffer from serious homogenization, simplistic duplication, and inconsistent design quality (Li & Yang, 2021). These products often fail to fully highlight their unique charm and rich heritage, resulting in low cultural added value and difficulty in inspiring consumers' emotional connection and purchase intent.

3. Design Requirement Analysis Based on Kano Model

3.1 Theoretical Research on Kano Model

1) Overview of Kano Model Theory

The Kano model, proposed by Professor Noriaki Kano at Tokyo Institute of Technology in 1984, is a tool used for classifying and ranking user needs (Li, 2022). Based on the relationship between different product quality characteristics and user satisfaction, the Kano model divides the factors that affect user satisfaction into essential attributes, expected attributes, attractive attributes, indifference attributes, and inverse attributes (Kano et al., 1984). As shown in Figure 3, this report applies the Kano model to analyze consumers' demand for Sanxingdui cultural and creative products, in order to guide product design practices.
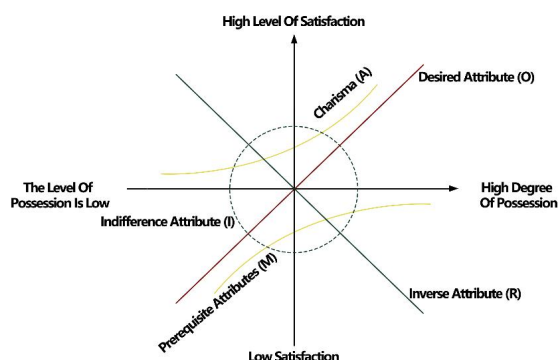

Figure 3: Kano model

2) User satisfaction analysis

The Better-Worse user satisfaction analysis was proposed by Berger et al. (1993), aiming to quantify the impact of functional attributes on user satisfaction by calculating the Better-Worse coefficient of functional requirements. The Better coefficient (0~1) reflects the degree of increase in user satisfaction when a product has a certain function. The closer the value is to 1, the more significant the improvement in satisfaction. On the contrary, the Worse coefficient (-1~0) represents the degree of decrease in user satisfaction when a product lacks a certain function. The closer the value is to -1, the more severe the increase in dissatisfaction. The specific formula for calculating the Better-Worse coefficient is:Better = (A+O) / (A+O+M+1), Worse =-1× (O+M) / (A+O+M+1).

According to the calculation results, the priority of functional requirements should be sorted according to the absolute value of the coefficient, with higher absolute values indicating higher priority. Finally, the coefficient scores of functional attributes are visualized through a four-quadrant bitmap and displayed in scatter form to clarify the priority order of user functional requirements. The research process of the Kano model is shown in Figure 4.
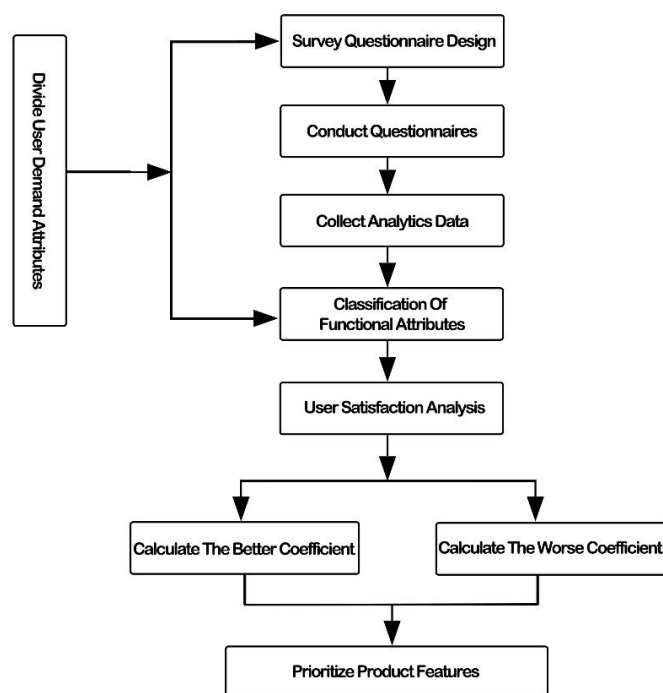

Figure 4: Kano Model Research Process

3.2 Requirement Research Process

1) Research on user needs for Sanxingdui cultural and creative industry

The innovative development of Sanxingdui cultural and creative products encompasses multiple dimensions, including product design, industry chain expansion, and cross-sector collaboration. Among these, a thorough analysis of consumer needs is an important prerequisite for enhancing product appeal and market competitiveness. As consumer channels become increasingly diversified, consumer evaluations, as real-time information, are often considered to have a significant impact on purchasing decisions (Zhang, 2023). This study employs the Kano model to conduct a hierarchical analysis of user needs during the design process, thereby formulating effective cultural and creative design strategies. We conducted comprehensive information collection, organization, and integration on three innovative forms of Sanxingdui cultural and creative products: namely "physical cultural products," "digital interactive products," and "cross-sector

co-branded products." We analyzed users' behavior patterns, diversity of needs, and feedback in detail during the design process, distilling the main user needs at different stages of promoting Sanxingdui cultural and creative products and identifying 23 functional requirement elements.

During the classification process, we followed the principles of "functional similarity" and "user goal consistency" to establish the following coding rules: First, two researchers independently extracted themes from each requirement; Then, the classification results were subjected to multiple rounds of discussion and adjustment through expert review. Ultimately, a consensus was reached, integrating the 23 requirements into five core requirement categories (see Table 1). This process ensured the organization and functionality of the classification, thereby strengthening the scientific basis for subsequent design strategy formulation.

Table 1: Sanxingdui Cultural and Creative Design Requirements Elements

Level 1 Demand	Numbering	Secondary Demand
Economic needs	Q1	Handmade
	Q2	Easy to transport
	Q3	The price is reasonable
	Q4	Packing modestly
	Q5	Energy saving and environmental protection
	Q6	Parts are replaceable
Experience needs	Q7	Fun to use
	Q8	Diverse operations
	Q9	Product interaction
Social needs	Q10	Gift-giving
	Q11	Social media
	Q12	Aesthetic symbolism
	Q13	Manifest your identity
Usage requirements	Q14	Simple and practical
	Q15	Easy to carry
	Q16	Material safety
	Q17	Memory carriers
	Q18	Emotional value
	Q19	Cultural heritage
	Q20	Innovative design
Aesthetic needs	Q21	Aesthetic value
	Q22	Colors are harmonious
	Q23	Characteristics of the times

2) Kano questionnaire design

Firstly, we established a two-way questionnaire based on the 23 needs listed in Table 2. The method involves collecting basic information about each participant and evaluating the 23 demand elements by asking both positive and negative questions. For example, if the demand element is integrated into the design of Sanxingdui cultural and creative products as a design element, what do you think? If this requirement is not

integrated into the design of Sanxingdui cultural and creative products, what do you think?

Table 2: Sanxingdui Cultural and Creative Product Demand Questionnaire (Part)

Level 1 Demand	Numbering	Yes Or No	Issue	I Like It Very Much	As A Matter Of Course	It Doesn't Matter	Barely accept it	I don't like it
Economic needs	Q1	Yes	When Sanxingdui cultural and creative products are made by hand, they have a unique handicraft aesthetic feeling and exquisite design. How do you feel?	●				
		No	How do you feel when Sanxingdui cultural and creative products are not made by hand and have a unique handicraft aesthetic feeling and exquisite design?			●		

Each question provides five options with scoring criteria: strongly like (5 points), taken for granted (4 points), indifferent (3 points), reluctantly accept (2 points), and strongly dislike (1 point), to quantify the level of consumer demand. The specific test questionnaire is shown in Table 3. Next, based on the Kano evaluation classification comparison table, the user's functional requirement attributes will be classified. The Kano evaluation classification comparison is shown in Table 3.

Table 3: Kano Evaluation Form

Product/Service Requirements	Reverse Problem					
	Scales	like	As it should be	Doesn't matter	Bearable	dislike
Positive questions	Like	Q	A	A	A	O
	As it should be	R	I	I	I	M
	Doesn't matter	R	I	I	I	M
	Bearable	R	I	I	I	M
	Dislike	R	R	R	R	Q

The target user group of the questionnaire is consumers of all ages who have purchased cultural and creative products. We distributed the questionnaire online and offline through Wenjuanxing and collected a total of 106 valid questionnaires. The basic information of the respondents in the questionnaire includes age, gender, occupation, and education. The specific basic information of the respondents is shown in Table 4.

Table 4: Basic information of questionnaire respondents

Classify	Options	Number Of People/Person	Proportion/%

Age	Under 18 years of age	5	4.72
	18-25 years old	85	80.19
	26-35 years old	7	6.6
	36-45 years old	5	4.72
	46 years of age or older	4	3.77
Gender	Man	31	29.25
	Woman	75	70.75
Career	Student	86	81.13
	Civil servants/personnel of public institutions	3	2.83
	Corporate Employees	6	5.66
	Freelancer	8	7.55
	Retiree	2	1.89
	Other	1	0.94
Degree	High school and below	5	4.72
	College	9	8.49
	Undergraduate	87	82.08
	Master	4	3.77
	Ph.D. or above	1	0.94

3.3 Analysis of Research Results

1) Classification and analysis of demand attributes

The Cronbach's alpha coefficient was used to analyze the reliability of the questionnaire results, and the overall coefficient of the questionnaire was 0.966, indicating that the questionnaire has good reliability. The validity of the questionnaire was tested using the Kaiser Meyer Olkin (KMO) statistics and the sphericity test. The mean KMO of the questionnaire was 0.852, which was higher than 0.800 and $p<0.050$, indicating good validity of the questionnaire (Zhu & Wei, 2018) and suitability for subsequent research analysis.

Using the Kano model, classify the 23 functional requirements of users into attributes, and calculate the Better coefficient and Worse coefficient according to equations (1) and (2). The specific classification results are shown in Table 5. From Table 5, it can be seen that among the 23 conceptual requirements, there are a total of 11 attractive attributes (A) and 12 indistinguishable attributes (I).

Table 5: Basic information of questionnaire respondents

Level 1 Demand	Numbering	Proportion/%						Kano Attributes	Better Coefficient/%	Worse Coefficient/%
		M	O	A	I	R	Q			
Economic needs	Q1	1.89	12.26	34.91	27.36	1.89	21.7	A	61.73	-18.52
	Q2	9.43	17.92	18.87	32.08	2.83	18.87	I	46.99	-34.94
	Q3	5.66	23.58	21.7	26.42	2.83	19.81	I	58.54	-37.8
	Q4	6.6	14.15	25.47	31.13	2.83	19.81	I	51.22	-26.83
	Q5	2.83	16.98	25.47	34.91	2.83	16.98	I	52.94	-24.71
	Q6	2.83	16.98	30.19	30.19	0.94	18.87	A	58.82	-24.71

Level 1 Demand										
Experience needs	Q7	2.83	16.04	29.25	28.3	1.89	21.7	A	59.26	-24.69
	Q8	1.89	14.15	35.85	26.42	1.89	19.81	A	63.86	-20.48
	Q9	2.83	15.09	30.19	28.3	0.94	22.64	A	59.26	-23.46
Social needs	Q10	1.89	15.09	30.19	29.25	2.83	20.75	A	59.26	-22.22
	Q11	4.72	13.21	28.3	31.13	1.89	20.75	I	53.66	-23.17
	Q12	3.77	16.04	27.36	33.02	0	19.81	I	54.12	-24.71
	Q13	3.77	12.26	26.42	38.68	0	18.87	I	47.67	-19.77
Usage needs	Q14	3.77	12.26	31.13	33.02	0	19.81	I	54.12	-20
	Q15	3.77	15.09	28.3	31.13	0	21.7	I	55.42	-24.1
	Q16	10.38	20.75	16.04	33.02	0.94	18.87	I	45.88	-38.82
	Q17	5.66	15.09	28.3	29.25	0.94	20.75	I	55.42	-26.51
	Q18	2.83	16.04	28.3	32.08	1.89	18.87	I	55.95	-23.81
	Q19	2.83	19.81	31,13	23.58	2.83	19.81	A	65.85	-29.27
	Q20	5.66	10.38	34.91	28.3	0.94	19.81	A	57.14	-20.14
Aesthetic needs	Q21	4.72	16.04	33.02	24.53	0.94	20.75	A	62.65	-26.51
	Q22	3.77	14.15	33.96	24.53	0	23.58	A	62.96	-23.46
	Q23	2.83	12.26	32.08	29.25	0	23.58	A	58.02	-19.75

2) Analysis of Better-Worse coefficient

Using the Better-Worse coefficient to calculate the sensitivity of each demand element in the same attribute classification in Table 6, optimizing the attribute classification of the Kano model, and obtaining the priority ranking of demand elements in the same demand attribute. The calculation formula is $S = \sqrt{\text{Better}^2 + |\text{Worse}|^2}$. The classification of optimized demand element attributes is shown in Table 6. According to the principle of the Kano model, the priority order of demand elements is usually: essential demand>expected demand>attractive demand>indifference demand (Costello & Osborne, 2005).

Table 6: Classification of demand element attributes

Level 1 Demand	Numbering	Secondary demand	Kano attributes	Optimized Kano Attributes	Sensitivity(s)	Prioritization
Economic needs	O1	Handmade	A	A	0.635	8
	Q2	Easy to transport	I	I	0.636	21
	Q3	The price is reasonable	I	O	0.762	1
	Q4	Packing modestly	I	I	0.604	20
	Q5	Energy saving and environmental protection	I	I	0.618	14
	Q6	Parts are replaceable	A	A	0.884	7
Experience needs	Q7	Fun to use	A	A	0.647	9
	O8	Diverse operations	A	A	0.700	3
	Q9	Product interaction	A	A	0.662	6
Social needs	Q10	Gift-giving	A	A	0.630	10
	Q11	Social media	I	I	0.572	19
	Q12	Aesthetic symbolism	I	I	0.617	15

	Q13	Manifest your identity	I	I	0.520	22
	Q14	Simple and practical	I	I	0.576	17
	Q15	Easy to carry	I	I	0.607	16
	O16	Material safety	I	I	0.602	23
Usage needs	Q17	Memory carriers	I	I	0.607	18
	Q18	Emotional value	I	I	0.632	13
	Q19	Cultural heritage	A	A	0.764	2
	Q20	Innovative design	A	A	0.606	11
	Q21	Aesthetic value	A	A	0.702	4
Aesthetic needs	Q22	Colors are harmonious	A	A	0.688	5
	Q23	Characteristics of the times	A	A	0.602	12

When analyzing the demand elements of Sanxingdui cultural and creative products in detail, we applied the Better-Worse coefficient method in the Kano model to optimize the classification of demand attributes and determine priority ranking. Through this process, we can more accurately identify which demand elements are most crucial for improving the user experience of Sanxingdui cultural and creative products.

This article combines the Better-Worse function, with the Better coefficient value as the vertical axis and the absolute value of the Worse coefficient as the horizontal axis, and uses the average of the Better value and the absolute value of the Worse coefficient as the quadrant boundary to draw a four quadrant graph of the Better Worse coefficient, clarifying the quadrants to which each demand element belongs and the priority of demand improvement (Yong & Pearce, 2013). Among them, the first quadrant represents expected attributes, involving users' expectations for Sanxingdui cultural elements and design innovation of cultural and creative products. Meeting these needs can significantly improve user satisfaction, while failing to meet them will decrease it. The second quadrant is the charm attribute, which refers to the elements in cultural and creative products that provide additional surprises and innovative experiences. Even if these are not provided, it will not affect the basic satisfaction of users; The third quadrant is the indifference attribute, which has a relatively small impact on the satisfaction of users of Sanxingdui cultural and creative products. It may be a feature or design that users are not very concerned about. The fourth quadrant encompasses essential attributes, including the quality, cultural accuracy, and basic usage functions of cultural and creative products. Failure to meet these needs can lead to a significant decrease in user satisfaction, as these are what users take for granted. The specific Better-Worse coefficient quadrant diagram is shown in Figure 5.
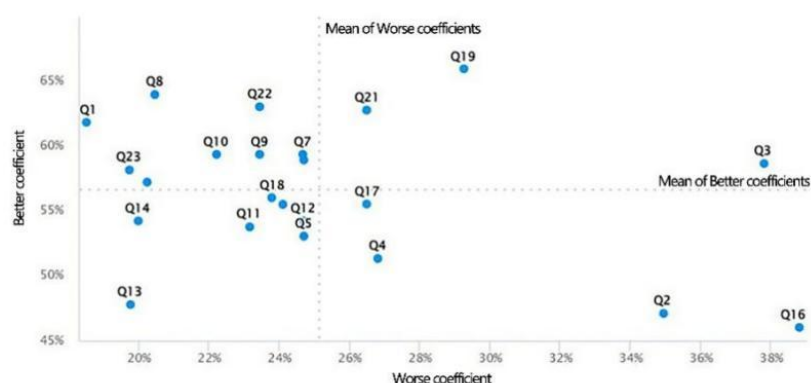

Figure 5: Quadrant diagram of Better-Worse coefficient

Figure 6 shows that, in the Better-Worse coordinate system, the 23 requirements for Sanxingdui cultural and creative products are mainly concentrated in the second and third quadrants, while being more scattered in the first and fourth quadrants. Seven requirements fall in the third quadrant, indicating they are primarily indifferent (I) requirements related to social and usage aspects, reflecting consumers' low sensitivity to these functional attributes. Notably, reasonable pricing, cultural heritage, and aesthetic value are located in the first quadrant, classifying them as expectation (O) demands. This demonstrates that these three attributes are crucial for enhancing consumer satisfaction and represent key considerations in current Sanxingdui cultural and creative product design.

Figure 6: Sanxingdui bookmark
Source: https://mp.weixin.qq.com/s/m4l7hSnQ0VFrd6HHFeU-bw

3) Ranking of Requirement Importance

After data analysis, it can be found that among the 23 secondary measurement items used in this study, 11 are charismatic requirements, 1 is an expected requirement, and 11 are undifferentiated requirements. According to the calculation of user satisfaction values, all measurement items were ranked in importance, and finally, Table 7 was formed.

Table 7: Ranking of Importance of Demand for Sanxingdui Cultural and Creative Products

The Type of Requirement	Rank In Importance
Charismatic needs	Q19 > Q8 > Q21 > Q22 > Q9 > Q6 > Q1 > Q7 > Q10 > Q20 > Q23
Expectation-based demand	Q3
There is no need for differentiation	Q18 > Q5 > Q12 > Q15 > Q14 > Q17 > Q11 > Q4 > Q2 > Q13 > Q16

Charm plays a vital role in Sanxingdui cultural and creative product design, significantly enhancing market appeal. According to Table 7, the charm-type demands are ranked by sensitivity value as follows: Q19 (profound cultural heritage), Q8 (diverse operations), Q21 (high aesthetic value), Q22 (harmonious color matching), Q9 (product interaction), Q6 (maintainable and upgradable parts), Q1 (handmade craftsmanship), Q7 (enjoyable user experience), Q10 (gift suitability), Q20 (innovative design), and Q23 (rich operational possibilities). This demonstrates that emphasizing cultural depth, aesthetic excellence, and diverse interactive features during design will substantially boost user interest and satisfaction.

Expected demand directly correlates with user satisfaction. The primary expected demand for Sanxingdui cultural and creative products is Q3 (reasonable price and high cost-effectiveness), highlighting the crucial role of appropriate pricing strategies in enhancing user satisfaction during product development and marketing.

Undifferentiated demands, while relatively low in user priority, still warrant consideration. Ranked by importance they include: Q18 (emotional value), Q5 (energy-saving and environmental protection), Q12 (aesthetic symbolism), Q15 (good port-ability), Q14 (simplicity and practicality), Q17 (memory preservation), Q4 (moderate packaging), Q2 (transport-safe packaging), Q13 (identity expression), and

Q16 (safe and reliable materials). Incorporating these aspects in Sanxingdui cultural and creative product design helps ensure broader user appeal.

4. Optimization Strategy for Design of Sanxingdui Cultural and Creative Products

Based on the Kano classification results presented in Section 3, optimization strategies were formulated for the five types of attributes (must-be attributes, performance attributes, attractive attributes, indifferent attributes, and reverse attributes) in the context of the current situation. With the promising prospects for cultural and creative development, China's museums are experiencing unprecedented growth in the cultural and creative industries. Museums make full use of rich cultural relics resources to develop creative products, bringing cultural relics into people's lives and extending and sublimating culture. However, for small and medium-sized museums, the development of cultural and creative industries faces many challenges. It is necessary to liberate the mind, innovate thinking, and activate creativity to achieve "cultural and creative development" and bring ideas to life (Zhou, 2020).

4.1 Optimization for Essential Attribute Requirements

The demand for portability among consumers has shifted from being an optional requirement to a strict expectation, driven by refined consumer preferences. The fast-paced modern lifestyle and fragmented scenarios require cultural and creative products to not only carry profound cultural connotations but also offer practical value that is easily accessible. From a cost-effectiveness perspective, this optimization can achieve significant benefits at a controllable cost, thereby enhancing overall cost-performance. Small cultural and creative products, such as Sanxingdui relic accessories, naturally possess the traits of being "easy to display and easy to spread," which can reduce marketing costs; their small size and light weight can significantly decrease packaging and shipping costs for online delivery and storage and display costs in offline stores, improving channel efficiency. Consumers are less price-sensitive to the convenient "small and exquisite" designs. They are willing to pay a reasonable premium for portability, allowing products to maintain profit margins while controlling costs. Therefore, cultural and creative designs should prioritize portability, balancing product form and practical function through clever design. For example, the Sanxingdui cultural relic accessories and the small bookmarks launched by the Sanxingdui Museum are not only portable but also cost-effective, meeting the consumer needs.

4.2 Optimization for Expected Attribute Requirements

The core of cultural and creative product design is to emphasize the importance of traditional culture. By embedding traditional culture as its guiding principle, these products can maintain long-term vitality (Zhao & Ji, 2025). Users expect products that offer a variety of functions, high aesthetic value, and an enjoyable user experience. When assessing the value of a product, consumers consider its functionality, quality, brand, and price before making a purchase (Zeithaml et al., 2020). Research has shown that when a product can provide a unique cultural experience and meet consumers' emotional needs, consumers' sensitivity to price decreases (Bennett, 2025). Therefore, designers can draw reference from the unique shapes of Sanxingdui cultural relics. In the process of transforming Sanxingdui Museum collections, it is necessary to construct cultural and creative products with aesthetic ideas and uniqueness (Li et al., 2021) while incorporating emotional elements. From a marketing cost perspective, do-it-yourself (DIY) products and experiences, such as virtual reality (VR) and augmented reality (AR), as well as relic restoration, are highly interactive and easy to share. In terms of channel efficiency, physical products, such as building blocks, come in standardized sizes. This enables low-cost online shipping and multiple styles, which are displayed on limited offline shelves, thereby boosting efficiency per store. Unique cultural experiences and

emotional value reduce consumers' sensitivity to price. Thus, slight increases in cost due to interactive designs are unlikely to hinder purchases, and the high added value ensures healthy profit margins. For example, the Sanxingdui Museum launched themed building blocks and puzzles to encourage creative DIY and enhance user engagement.

Figure 7: Sanxingdui wood
Source: https://mp.weixin.qq.com/s/nqYg0cocs8QxusX3uBL1Yw

4.3 Optimization for Charm Attribute Requirements

Users showed strong interest in interactive functions such as VR and AR, as well as gift design. This interest reflects their desire to integrate into ancient civilization through immersive experience. Designers should strive to maintain cultural authenticity while actively exploring innovative methods. The strategic implementation of AR technology enables cultural relics to overcome the limitations of traditional creation while maintaining contemporary relevance (Xu, 2021). From a marketing perspective, AR experiences combine novelty and shareability to generate user-created organic content, thereby reducing promotional costs. Additionally, this technology improves channel efficiency by integrating online and offline experiences. Although the implementation of AR may increase production costs, the added value of the experience helps maintain the purchase intention of gift buyers, who prioritize uniqueness over price sensitivity. A notable example of this is the virtual reality restoration project at the Sanxingdui Museum, where tourists can explore the stories behind the relics in an immersive virtual environment.

Figure 8: Sanxingdui Interactive Experience Hall
Source: https://mp.weixin.qq.com/s/dDmBts-5JnP5MZEuaD9Pqg

4.4 Optimization for Indistinguishable Attribute Requirements

For some users, the aesthetic appeal of a product or the need for specific color coordination is not an important factor in their purchasing decisions or user experience. Therefore, in design, there is no need to overemphasize these aspects. However, basic aesthetic principles should be followed to ensure the product appears harmonious and comfortable. This includes avoiding jarring colors or disproportionate elements. This is to ensure that the product possesses universal appeal and establishes users' initial trust in its quality, rather than catering to niche demands. In terms of marketing costs, there is no need to invest heavily in research, design, or promotion for niche aesthetic demands.

By controlling costs from the source, such as reducing high-end design fees and special materials, the price competitiveness of the product can be enhanced. A good example for this is the "Sanxingdui Blind Box," which was awarded the "Tianfu Tourism Premium Product" title. It features a creative design inspired by Sanxingdui elements, adhering to basic aesthetic principles, avoiding detailed descriptions to maintain a sense of mystery, while simultaneously presenting an appealing appearance.

Figure 9: Sanxingdui · Blind Box Series
Source: https://mp.weixin.qq.com/s/T0uuyjyjKGihauKC4sBX1g

4.5 Optimization for Reverse Attribute Requirements

To address complaints about packaging and portability, improvement measures should include using durable, environmentally friendly materials and optimizing packaging structure to facilitate fragile or difficult-to-open items. Additionally, developing ergonomic carrying solutions, such as portable cases, would improve travel convenience. These enhancements not only improve the user experience but also reduce transportation damage and costs, while increasing product value. For example, the environmentally friendly gift box from the Sanxingdui Museum shows the successful implementation of this portable design.

Figure 10: Gift box packaging
Source: https://mp.weixin.qq.com/s/OKuIQi0VUlnStl94ziEY4g

5. Conclusion

5.1 Summary of Findings

This study focuses on optimizing user experience by employing the Kano model and the Better-Worse coefficient, combined with literature analysis and questionnaire surveys. It aims to construct a Sanxingdui cultural and creative product user demand system covering five primary needs—economic, experiential, social, functional, and aesthetic—and 23 secondary needs. Through classification of demand attributes, it was determined that out of the 23 needs, 11 are attractive attributes (the top three priorities are cultural heritage, operational diversity, and aesthetic value), 1 is a must-be attribute (reasonable pricing), and 11 are indifferent attributes. The Better-Worse coefficient analysis indicates that most needs are concentrated in the second quadrant (attractive attributes) and the third quadrant (indifferent attributes), with reasonable pricing,

cultural heritage, and aesthetic value located in the first quadrant (must-be attributes), which are key to enhancing user satisfaction. Furthermore, by segmenting users based on demand characteristics, the study reveals differences among user groups in their sensitivity to functionality, emotions, and cultural meanings. This provides precise directions for product optimization.

5.2 Theoretical and Practical Implications

In terms of theory, it has enriched the application of the Kano model in the field of traditional cultural and creative products. It verifies the model's effectiveness in classifying and prioritizing user needs for these products. Additionally, it establishes a multidimensional user demand system for Sanxingdui cultural and creative products, addressing a significant research gap in this area. This work provides a theoretical framework for analyzing the demand for similar traditional cultural and creative products.

In terms of practice, provide a clear path for optimizing Sanxingdui cultural and creative products: strengthen portability for essential attributes, deepen cultural connotation and interactivity for desired attributes, and develop immersive experiences for charm attributes, effectively addressing issues such as current product homogenization and lack of design innovation; assist in upgrading the Sanxingdui cultural and creative industry: guide precise marketing and brand enhancement, promote the deep integration of traditional culture with modern consumer demands, and facilitate the sustainable development of the cultural and creative industry.

5.3 Limitations and Future Research

This study has certain limitations. In data collection, the questionnaire did not sufficiently investigate users' purchasing power, failing to link demand preferences with actual consumption capacity. Additionally, the sample structure was unbalanced—students aged 18-25 (80.19%) and those with bachelor's degrees (82.08%) dominated, while middle-aged consumers, cultural industry practitioners, and other age/occupational groups were underrepresented, which may reduce the generalizability of the findings. In terms of analysis, the study lacked quantifiable metrics for understanding how demands impact purchasing intentions and failed to integrate economic feasibility with cultural and design dimensions, leading to inadequate cost-benefit considerations in product optimization recommendations and limited support for practical cultural and creative product development decisions.

To address these limitations, future research should advance in multiple areas. First, it is essential to expand and optimize the sample to cover a diverse range of ages, professions, and regional groups. Additionally, introduce quantifiable demand impact indicators to enhance consumption capacity assessment and improve the precision of demand analysis.

Second, deepen the integration of culture, design, and economics. This can be achieved by refining user clustering based on consumption capacity and cultural preferences, as well as conducting in-depth economic evaluations of demand-driven design strategies.

Furthermore, it is important to stay aligned with market and technological trends. For example, using short videos and other new media to expand the dissemination channels of Sanxingdui cultural and creative products. Exploring ancient Shu symbols, like bronze masks, to enhance cultural uniqueness. Moreover, integrating AI-generated design and metaverse experiences can help modernize product design strategies, thereby promoting the innovative preservation of Sanxingdui culture and the sustainable development of the cultural and creative industry.

References

Bennett, L. (2025). Perceptions of value co‐creation in marketing and supply chain integration. *Preprints*. https://www.preprints.org/manuscript/202501.1528/v1.

Berger, C., Blauth, R., & Boger, D. (1993). Kano's methods for understanding customer-defined quality. *Center for Quality Management Journal*, 2, 3-36. https://sid. ir/paper/642358/en.

City Media Center. (2025). With an annual cultural and creative income of about 200 million yuan, Sanxingdui, which engages in cultural and creative activities, does not act as a "hands-off manager." Here's a look at how the scenic area "participates" in cultural and creative work through three pieces of data and two small stories. *Guanghan Municipal People's Government Official Website*. https://www.guanghan.gov.cn/gk/mbjj/sjmb/1682061.htm.

Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1-9. https://legacyfileshare.elsevier.com/promis_misc/teln-best-practices-in-exploratory-factor-analysis.pdf

Feng, J., & Li, Z. Y. (2025). Research on innovative design and development of Sanxingdui cultural and creative products. *Shanghai Packaging*, (01), 149-151. https://doi.org/10.19446/j.cnki.1005-9423.2025.01.045.

Hara, K. (2006). *Designing Design*. Shandong People's Publishing House. ISBN:7-209-04106-0.

Hu, J. F., & Luo, C. (2025). The aesthetic connotations of Sanxingdui bronzes. *Central Plains Literature*, (08), 195-197. https://kns.cnki.net/kcms2/article/abstract?v=ygxn0A4FGUGq6yEQcyrT4UU_5CqMvCi90MPtmb6rejfEJt2lGNMkosXHHrCKhgVWq5RJkKvInX8sMDE1bAh3sIUhThTke1CUv4Xvar_Fs3p8eRgTJENASXlZ4E92Ua1sGC85wZoFfPgvETS8SFqg84fN1PUhCR5MfsGxBvNcH8tzyN_mv3oh4m10pGCi477c&uniplatform=NZKPT&language=CHS.

Kano, N., Seraku ,N., Takahashi ,F., & Tsuji ,S. (1984). Attractive quality and must-be quality. *Journal of The Japanese Society for Quality Control*, 14(2), 39-48. https://doi.org/10.20684/quality.14.2_147.

Kui, J. H. (2015). Development of China's Cultural Industry from the Perspective of the Industrial Chain. *Chinese Collective Economy*, (13), 102-103. https://doi.org/10.3969/j.issn.1008-1283.2015.13.056.

Li, D., & Yang, C. (2021). Research on the design method of regional tourism cultural and creative products. *Design*, 34(17), 61-65. https://doi.org/10.3969/j.issn.1003-0069.2021.17.020.

Li, F. (2025). Sanxingdui ancient Shu civilization: Contemporary value exploration and cultural symbol construction. *New Legend*, (10), 22-24. https://kns.cnki.net/kcms2/article/abstract?v=ygxn0A4FGUE7h7c8Iw5whXeFSj2M0zIMDVF6beJBoN_4SorokQB0EweFS9urPn_MK9rVE8yzltUk8TBo_Z4EG59A2Z0nSTUdnMIfFJpygOnHthiF1WOqNJDyPM2NVmIYbxQ6vLg7wyyw7cphnrw9OOb7rpseUBDlretK-jiTtU6Fq0uYaQFCluR1nxYU9Q97&uniplatform=NZKPT&language=CHS.

Li, S., & Jiang, P. (2022). Research on user requirement identification method based on fuzzy KANO-SEM model. *Packaging Engineering*, 43(04), 156-162. https://doi.org/10.19554/j.cnki.1001-3563.2022.04.018.

Li, S., Yi, S. S., Zheng, R. H., & Jia, Y. J. (2022). Research on emotional design of museum cultural and creative products. *Packaging Engineering*, 43(16), 372-379. https://doi.org/10.19554/j.cnki.1001-3563.2022.16.044.

Li, Y. J. (2021). Design is a systematic scientific research. *Design*, 34(08), 66-69. https://doi.org/10.3969/j.issn.1003-0069.2021.08.009.

Li, Y. Z. (2007). *Dimensions of Design*. Chongqing University Press. ISBN:978-7-5624-4001-7.

Liu, S. (2023). The problems and countermeasures of museum cultural and creative industry in Xinjiang Region. *Cultural Relic Appraisal and Appreciation*, (20), 88-91. https://doi.org/10.20005/j.cnki.issn.1674-8697.2023.20.022.

Lovelock, C. H., & Wirtz, J. (2010). *Services Marketing*. Renmin University of China Press. ISBN:9787300121550.

Norman, D. A. (2015). *The Design of Everyday Things*. CITIC Press. ISBN:9787508657202.

Su, S. Y. (2021). Research on the current situation, shortcomings, and countermeasures of Luoyang cultural and creative product development. *Journal of Luoyang Institute of Science and Technology* (Social Sciences Edition), 36(02), 24-31. https://doi.org/10.3969/j.issn.1674-5035.2021.02.005.

Wang, L. Y. (2022). Traditional cultural IP redesign in co-marketing: A case study of Sanxingdui cultural and creative cross-border marketing. *New Beautiful Land*, (12), 73-75. https://doi.org/10.3969/j.issn.1009-7066.2022.12.027.

Wang, S. (2025a). Aesthetic exploration of Sanxingdui bronze art. *Tiangong*, (13), 18-20. https://doi.org/10.3969/j.issn.2095-7556.2025.13.008.

Wang, T. R. (2025b). Practical exploration of the development of cultural and creative industries in museums: A case study of the Sanxingdui Museum. *Cultural and Museum Journal*, (01), 59-69. https://kns.cnki.net/kcms2/article/abstract?v=ygxn0A4FGUHD03MRXOAzXsKyve6SrjVYhJnurCX87vTVEJYEyy-F_iwySUwS8o3nSGlMr7_STmXTob23GqfGxzjbDjz_sYnVtUcYLQOPc9qdqMjEQuUcd-dS_abmvELTvTv7dfFYS874eF2qrC9i9Jehh-NypIPImoHKZATdjWNnkwevZNFcWSG26Fj2pnYLexIOyUAcLac=&uniplatform=NZKPT&language=CHS.

Xu, L. (2021). Research on cultural and creative product design of Sanxingdui Museum [Master's thesis, Chengdu University]. https://link.cnki.net/doi/10.27917/d.cnki.gcxdy.2021.000202.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials In Quantitative Methods for Psychology*, 9(2), 79-94. https://doi.org/10.20982/tqmp.09.2.p079.

Zeithaml, V. A., Verleye, K., Hatak, I., Koller, M., & Zauner, A. (2020). Three decades of customer value research: paradigmatic roots and future research avenues. *Journal of Service Research*, 23(4), 409-432. https://doi.org/10.1177/1094670520948134.

Zhang, H. (2025). Innovative transformation of Sanxingdui cultural relics in cultural and creative products. *Tomorrow's Fashion*, (06), 134-136. https://kns.cnki.net/kcms2/article/abstract?v=ygxn0A4FGUFcmEDXM_spQmp1etvgGApiMOqEBADaxlr5_inA8bRWkAM6GIgVr4A69V_Kc1ZFYEUK6-96d2fSUZGgXEHQtPbmfQCqc6A2w6k3Drie1fP4e3YBMTwndUGV_maX2jPuZ8ffg8_ajphvLgPwHrVFDwlPi7N72UAh1CjFtyC1oJeS5si-KNnPFkdy&uniplatform=NZKPT&language=CHS.

Zhang, Y. L. (2023). The mechanism of perceived value in the digital social era on attitudes toward clothing brands: An empirical study based on reference groups and self-consistency perspective. *Journal of Wuhan Textile University*, 36(02), 75-79. https://doi.org/10.3969/j.issn.2095-414X.2023.02.014.

Zhao, Y. T., & Ji, L. L. (2025). Research on strategies for empowering local economic high-quality development through cultural and creative product design. *Packaging Engineering*, 46(10), 392-395. https://doi.org/10.19554/j.cnki.1001-3563.2025.10.042.

Zhou, Y. N. (2020). Opportunities are also challenges - the cultural and creative development of small and medium-sized museums. *Art Review*, (29), 124+187. https://kns.cnki.net/kcms2/article/abstract?v=ygxn0A4FGUGT--YTdI5syjmAfuNZXcTOTurzS4E9dNGLS9LCVrkpq7eBjPb4QZS1XGbdXkHC-g5RfqV4xNcQrdBA1SF9Mj2sL0ivgHquB0Ix62PgzTW82Kj1AALooyu5Ii0eFdAVYE_PTT9bIo5UPQxtgiE2aoLFsqvFj4dHRkclHO-QFaF6iaWXlqTNIN4Ezus6YPLyZME=&uniplatform=NZKPT&language=CHS.

Zhu, W. M., & Wei, Y. H. (2018). Study on the differences in the experiential value of personalized clothing customization in different scenarios. *Journal of Textile Research*, 39(10), 115-119. https://doi.org/10.13475/j.fzxb.20171202505.