RESEARCH ARTICLE

Exploring the impact of perceived value on cultural communication willingness during visits to folklore museums: An analysis based on LDA and fsQCA

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Abstract

The synergistic development of culture and tourism is an important driver of global economic growth. As key venues that bear collective memory and sustain cultural roots, folklore museums have assumed an increasingly prominent role in cultural communication and identity formation amid evolving social demands and a globalized context of national cultural identity. However, existing research has yet to fully elucidate the complex mechanisms by which perceived value in the folklore museum context shapes visitors' willingness for cultural communication. Grounded in complexity theory, this study develops a configurational analysis framework linking perceived value, satisfaction, and cultural communication willingness. Using five Chinese folklore museums as cases, it combines Latent Dirichlet Allocation (LDA) and fuzzy-set Qualitative Comparative Analysis (fsQCA), focusing on perceived content in visitors' online reviews to identify five perceived value dimensions—cultural, functional, social, emotional, and conditional—and to reveal the intricate influence mechanisms through which these dimensions affect cultural communication willingness. From the perceived value configurational paths that yield high cultural communication willingness post-visit, the study identifies three perceived value–driven models: the Culture-Conditional-Functional Value Perception Driven Model, the Culture-Functional-Emotional Value Perception Driven Model, and the Culture-Social-Conditional Value Perception Driven Model, and proposes targeted enhancement strategies for each. Cultural value emerges as a core condition across all paths, functioning as an INUS condition—an indispensable yet not sufficient component within the pathways—underscoring its central driving role in perceived value combinations. The findings provide scientific guidance for optimizing and upgrading other cultural tourism destinations, while imparting sustained momentum to cultural heritage preservation and the enhancement of national soft power.

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Introduction

Cultural attributes significantly influence destination choices. According to the latest United Nations data, global international tourist arrivals are projected to reach approximately 1.52 billion in 2025, a 4% increase over 2024 [1]. Long-term data released by UNESCO in 2026 indicate that cultural tourism accounts for roughly 40% of tourism activity worldwide, and about 30% of travelers state that they choose a destination because of a specific cultural or heritage event [2]. Museums have transformed from mere custodians of heritage to dynamic nonprofit institutions that actively engage communities by preserving, interpreting, and exhibiting tangible and intangible cultural assets with a strong focus on visitor experience. They now offer diverse programs in education, entertainment, reflection, and knowledge sharing, driving sustainable development. This evolution in museum tourism enhances regional cultural dissemination, bolsters national cultural influence, and facilitates cultural export and international exchange. Additionally, visitors' recommendations and shared cultural insights further deepen travel satisfaction, cultivate long-term museum relationships, reinforce regional cultural identity, and increase tourism consumption potential [3].

Amid the flourishing of cultural tourism and deepening exchanges and mutual learning among civilizations globally, folklore museums—as critical venues that bear collective memory and sustain cultural roots—have increasingly salient research value in terms of cultural protection and continuous dissemination. Folklore museums emerged alongside rising living standards, diversification of cultural industries, and the transmission and safeguarding of national cultures [4], and as a museum type that originated in the nineteenth century and continues to this day, they have evolved from the traditional model "aimed at preserving, exhibiting, and studying everyday items related to life customs" to contemporary institutions that integrate traditional wisdom and aesthetics, leisure and heritage research, cultural display and education [5,6]. Compared with other types of museums, folklore museums are marked by pronounced cultural attributes and deep civilizational threads; their quotidian, diverse folk cultures more readily evoke spiritual resonance and emotional identification among visitors. In a global context characterized by complexity and volatility, with cultural conflict and fusion coexisting, identity and cohesion forged through cultural communication have become crucial means to strengthen national spirit, maintain social stability, and elevate international influence. Nevertheless, current research on museum visitors' perceived value has largely focused on natural attractions or museums encompassing a broad array of elements [7], and has paid relatively little attention to folklore museums as important cultural exchange hubs. As folklore museums increasingly emerge as key nodes in cultural tourism, elucidating the perceived value dimensions in visitors' experiences and unpacking the complex configurational pathways that give rise to high levels of cultural communication willingness post-visit can not only fill gaps in the existing literature, but also provide scientific reference for optimizing value configurations and enhancing cultural communication effectiveness at other culturally-oriented tourism destinations.

Perceived value, as a composite evaluative feeling, arises from the interplay of various values in specific contexts during tourism experiences and is key to

influencing satisfaction and behavioral intentions [8]. Complexity theory maintains that within complex systems, multiple conditions are interconnected by nonlinear relationships, with changes in these relationships influencing outcomes [9]. Likewise, tourists' cultural dissemination behaviors after visiting are shaped not by a single factor but by the combined effects of various perceived variables [3]. Prior studies have typically treated perceived value as a set element encompassing multiple subsets and have employed linear methods such as confirmatory factor analysis and structural equation modeling for validation, while paying limited attention to probing and evidencing its specific internal dimensions and interrelated effects [10].

In the era of big data, the openness and shareability of social networks make it easier for people to obtain information about travel destinations and enable them to share travel experiences and feelings anytime and anywhere while providing recommendations to others [11]. Theme modeling methods based on generative probabilistic models, such as Latent Dirichlet Allocation (LDA) [12], can comprehensively explore the specific dimensions and content of visitors' perceived value in museum visits, providing a reliable foundation for developing strategies to enhance cultural dissemination intentions post-visit. Additionally, to examine the complex interactions among perceived value's intrinsic dimensions, fuzzy set qualitative comparative analysis (fsQCA) can uncover deeper influence mechanisms [13], capturing the interplay among multiple causal conditions and identifying perceived value configurations that drive high cultural dissemination intentions after visits.

Accordingly, this study focuses on folk museums, collecting tourist reviews from China's top three tourism platforms using web scraping technology. It employs LDA Theme modeling to analyze online comments, identifying the sub-dimensions and relationships of visitors' perceived value during folk museum visits. Acknowledging the complex interactions among perceived value dimensions that influence cultural dissemination intentions, the study further utilizes fsQCA to examine the configurations and pathways of perceived value conditions affecting post-visit cultural dissemination intentions. The objective is to comprehensively reveal both the dimensions and intrinsic meanings of perceived value in folk museum visits and the complex configurations that foster high cultural dissemination intentions. This approach facilitates the development of targeted enhancement strategies, deepens the understanding of museums as cultural dissemination platforms amid contemporary societal changes, and promotes cultural communication, educational heritage, and sustainable economic development through innovative cultural heritage practices.

Research theories and concepts

Perceived value

The notion of perceived value was first advanced by Zeithaml and other scholars, and at its core refers to the overall subjective assessment that consumers form of a product or service after weighing the benefits received against the costs incurred [14]. Early studies typically treated perceived value as a unidimensional construct, focusing primarily on the trade-off between "price" and "quality," that is, judgments of whether something is "value for money." The concept of perceived value has been widely employed to analyze and understand tourists' future behavior in purchase decision-making, and, as such, attention to perceived value provides a sound basis for attracting responsible tourists who share common values [15,16]. As research has deepened and broadened, scholars have come to recognize that consumers' perception of a value object or value process is not confined to economic comparisons; rather, it is a multidimensional, dynamically evolving psychological structure that plays an important guiding role in consumers' decision-making processes and behavioral choices. Building on earlier theory, Sweeney, Sheth, and others gradually extended perceived value from a single dimension to "four-value" and "five-value" theories, and pointed out that, as a psychologically constructed goal in a specific context, the dimensional structure of perceived value exhibits different emphases across contexts [17–19].

In the field of tourism research, perceived value has similarly attracted wide attention as a key factor influencing tourists' behavioral intentions. When exploring the antecedents to the formation of responsible tourist behavior, Liu

et al., drawing on place attachment theory and the cognition–affect model, proposed a perceived value model that activates tourists' attitudes of attachment to the destination. Starting from the goal of constructing destination social responsibility, they argued that the perceived value dimensions affecting tourist behavior include economic value, environmental value, and social value [20]. In examining changes in visitors' attitudes toward Africa after visiting an African art museum, Meng et al., based on attitude theory, verified that personal value, art perceived value, and social perceived value are important dimensions influencing tourists' behavioral intentions [21]. From the perspective of social identity theory, Xiao et al. investigated how enhancing experiential value in intangible cultural heritage tourism strengthens tourists' sense of cultural identity and, in turn, exerts a significant positive effect on satisfaction. The study found that functional value, emotional value, social value, and cognitive value are critical dimensions driving the formation of tourist satisfaction and loyalty [22]. Li et al., grounded in the Value-Attitude-Behavior model and the Theory of Planned Behavior, analyzed the positive effects of social, aesthetic, historical, and economic values on residents' behavioral intentions in a rural tourism context, and revealed the mediating role of attitude in these relationships [23].

Because of differences in theoretical foundations, path logic, and application scenarios, studies of the mechanisms by which perceived value affects tourist behavior exhibit variations in dimensional delineation. However, for folklore museums—venues with distinctive features and significant importance in cultural protection and cultural communication—there remains a lack of in-depth inquiry, based on authentic visitor reviews, into the perceived value dimensions and their specific connotations formed during visits, and a systematic elucidation of how tourists construct perceived value in the museum experience and how it affects satisfaction and subsequent cultural communication behavior.

Satisfaction

The concept of satisfaction originated in the fields of consumer behavior and marketing and is defined as the psychological state of an individual following a comparison between actual experience of a product or service and prior expectations [24]. In tourism research, satisfaction is operationalized as the overall evaluation by tourists, upon completion of a trip, of the destination and its experiences, services, environment, and other aspects. It emphasizes tourists' subjective perceptions of their visit and reflects their level of approval of the destination and future intentions. Mohamed et al. found that the practicality and immersiveness of technology during visits can enhance tourists' level of satisfaction [25]; Weng et al. showed that public services in cultural tourism have a significant positive effect on tourist satisfaction [26]; and, based on Expectancy Disconfirmation Theory, it has been noted that low satisfaction directly triggers negative behaviors and feelings of regret, further leading to the spread of negative word-of-mouth [26,27].

As the scope of satisfaction-related research in tourism has expanded and causal complexity has been progressively explored, satisfaction has come to serve both as a metric quantifying tourists' recognition of and feelings toward a destination and as a mediating factor explaining the pathways through which service quality, destination image, and perceived value affect subsequent responsible behaviors and communication intentions. In smart tourism research, Chen et al. indicated that satisfaction, as an explicit indicator of the effectiveness of smart tourism services, also significantly promotes tourists' happiness during their visits [28]. In a study of coastal cultural destinations, Otto et al. confirmed the significant influence of emotional and social value on satisfaction, a process that is likewise decisive in shaping subsequent revisit, recommendation, and communication intentions [29]. Nikoleta et al. demonstrated that high satisfaction can effectively diminish tourists' resistance to revisiting and recommending a destination, whereas low satisfaction significantly suppresses the emergence of loyalty behaviors such as revisit intention and communication intention [30]. Accordingly, exploring how to enhance tourists' satisfaction during their visits so as to effectively foster positive behaviors is not only an important point of entry for optimizing destination management decisions, but also a critical foundation for promoting the sustainable development of the tourism industry.

Cultural Communication Willingness

In tourism processes and contexts, cultural communication is often regarded as a manifestation of post-visit behavior [3,31]. It typically involves one social group transmitting specific cultural traits to another, expressed through proactive dissemination on social media, the transmission of cultural knowledge, interactive exchanges, and cultural consumption behaviors [32–34], thereby fostering intercultural interaction and identity recognition, mitigating conflictual discourses between cultures, and strengthening prospects for sustained cooperation in cultural diplomacy. In the context of museum tourism, proactive communication behaviors such as recommending museums to other groups and promoting cultural heritage knowledge generally signify recognition of and loyalty to the cultural experiences gained from prior travel [33,35]. Drawing on communication dynamics, Chen et al. demonstrated that cultural tour experiences exert a positive impact on tourists' personal qualities and cultural communication behaviors [3]; Wang et al. noted a significant positive correlation between perceived value and subsequent recommendation intention, whereas correlations with revisit intention and other loyalty behaviors were relatively weak, a finding also reported by Dedeoğlu et al. and Yang et al. [36–38].

Within cultural tourism and museum settings, tourist satisfaction, as a core indicator for gauging the quality of the tourism experience, is also a key predictor of post-visit cultural communication willingness. Dini et al. pointed out that emotional fulfillment and overall satisfaction in cultural tourism are decisive factors driving tourists to share information, engage in social dissemination, and diffuse word-of-mouth [39]. In studies of social media behavior, Han and Bae revealed that highly satisfied tourists are more inclined to share cultural experiences proactively on social networks, becoming "cultural ambassadors" for the destination [40]. Wu et al. likewise emphasized that although perceived value is an important antecedent of cultural communication willingness, satisfaction is the indicator directly associated with communication willingness and other loyalty behaviors [41]. In sum, satisfaction serves as a core metric of cultural communication willingness because it both reflects tourists' cultural recognition of the destination and stimulates their sustained motivation for cultural communication and social influence. Compared with a single cognitive, affective, or behavioral variable, satisfaction is a composite of multidimensional experience and behavioral intention, accommodating experiential complexity and the actual translation into communicative behaviors.

Although existing studies have addressed the positive association and mechanisms between satisfaction and cultural communication willingness, theoretical and empirical gaps remain regarding how, under complex causal mechanisms, satisfaction based on different configurational arrangements of perceived value dimensions affects cultural communication willingness. Moreover, discussions of the practical implications of leveraging research findings to optimize cultural tourism destination management and enrich pathways for sustainable cultural communication remain relatively limited. Therefore, grounded in complexity theory's emphasis on the joint effect of multiple factors, and to excavate the perceived value structure among visitors to folklore museums, fill gaps in perceived value research, and clarify the complex mechanisms by which multiple value dimensions affect satisfaction and behavioral intentions, we pose the following research questions:

RQ1: According to authentic visitor online reviews, what content and dimensions constitute tourists' perceived value when visiting folklore museums?

RQ2: In folklore museum visits, how do different configurational arrangements of perceived value dimensions influence tourists' post-visit cultural communication willingness?

RQ3: Based on the findings, how can the perceived value configuration of folklore museums be optimized to provide scientific pathways for enhancing cultural tourism destinations and sustainable cultural communication in tourism contexts?

Research Design

Selection of Research Subjects

According to the "Museum Classification Evaluation Standards," Chinese folk museums are divided into four levels: Level I, II, III, and unclassified. Museum types include state-owned and non-state-owned [42]. Based on a comprehensive

assessment of levels, types, regional diversity, and the volume of online visitor reviews on tourism platforms, the study selected five folk museums for analysis. These museums represent three levels, two types, and offer rich exhibition experiences (Table 1). By increasing the sample size, the research enhances the generalizability and applicability of the results, providing empirical references for developing strategies to improve tourists' cultural dissemination intentions across different types and levels of museums and tourism destinations.

Data Collection and Preprocessing

Dazhong Dianping, Ctrip, and Qunar are the top three online tourism platforms in China, each with daily visit volumes exceeding 15 million. The study collected visitor text reviews of five folk museums from these three platforms over a ten-year period from October 2014 to October 2024, yielding a total of 5,978 initial data entries. Considering data validity and the platforms' increasingly robust text-filtering mechanisms, non-text default ratings were preliminarily removed during data crawling. To preserve tourists' authentic affective expressions and semantic integrity to the greatest extent possible, we adopted a conservative preprocessing strategy. Specifically, automated Python scripts were used to remove HTML tags, special characters, and irrelevant punctuation. We then programmatically identified and excluded blank reviews and meaningless strings of garbled characters (e.g., consecutive non-semantic symbols), followed by manual inspection to ensure that no such records were overlooked. For duplicate data, only redundant reviews with identical content were removed. Very short reviews (e.g., "very good", "worth visiting") were retained because they still convey clear affective valence and evaluative meaning.

Based on the Baidu lexicon and the stopword list released by the Harbin Institute of Technology (HIT), we constructed a baseline stopword set, primarily to filter function words with limited semantic content, such as pronouns, prepositions, conjunctions, and modal particles (e.g., "de", "le"). After multiple rounds of testing, we intentionally did not include domain-core terms such as "museum", "folklore", and "culture" in the stopword list. These terms are central carriers of tourists' perceptions and, when co-occurring with other affective and concrete words, help characterize perception contexts more precisely and thereby enhance interpretability. Ultimately, 5,936 valid reviews were retained for subsequent analyses.

To ensure the data validity of using platform satisfaction scores as a proxy indicator for cultural communication willingness, this study conducted a sampled textual analysis of the corpus of highly satisfied reviews, defined as those scoring above 45 out of 50. In parallel, reviews with extremely low satisfaction scores, defined as below 5, were introduced as a control group, so as to strengthen the non-probabilistic, data-scientific validity test of cultural communication willingness in textual reviews. From 5,936 reviews, we randomly selected approximately 20% of the reviews meeting the high-score and low-score criteria for manual coding, with a focus on identifying and extracting review texts that implied cultural communication willingness for verification. Two coders with backgrounds in tourism research were invited to identify linguistic cues related to communication willingness, which were broadly summarized into two dimensions: (1) explicit recommendation

Table 1. Basic Information of Five Folklore Museums.

Museum Name	Level	Management Type	Category	Year Established
Nanjing Folk Museum (Ganxi Residence)	National First-Class Museum	State-owned	Folklore Thematic Museum	1992
Beijing Folk Museum	National Second-Class Museum	State-owned	Folklore Thematic Museum	1999
Luoyang Folk Museum	National Second-Class Museum	State-owned	Folklore Thematic Museum	1988
Northeast Ethnic and Folk Museum	National Third-Class Museum	State-owned	Ethnic Folklore/Thematic Social Sciences Museum	2014
Tianjin Folk Museum (Tianhou Palace)	Unclassified	Non-state-owned	Folklore Thematic/ History Museum	1986

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willingness, such as "highly recommended," "well worth a visit for museum enthusiasts," and "worth visiting to learn about and understand"; and (2) implicit willingness for education and sharing, such as "taking children to learn about traditions," "sharing heritage stories with family," "taking photos for school assignments," "suitable for learning traditional culture," and "worth exploring and experiencing" (Table 2). Cohen's Kappa coefficient was used as the reliability index. The results showed that the Kappa values for all dimensions exceeded 0.8, indicating a high level of coding consistency. During the identification of the sub-dimension "cultural spirit," a small number of disagreements arose at the initial stage; these were resolved through discussion and negotiation between the two coders, leading to final consensus. The coding results of the sampled texts show that approximately 87% of the high-scoring reviews contained cues of positive cultural communication willingness, whereas only 18.4% of the low-satisfaction reviews contained such cues. This indicates that, in this dataset, star ratings and communication willingness are not merely an accidental co-occurrence, but rather exhibit a substantive covariation. The significant relationship between high satisfaction scores and positive willingness to share provides stable empirical support for the theoretical foundation of this study and for the subsequent configurational analysis of complex perceptual dimensions.

Research Process

Perceived value dimensions serve as crucial intrinsic factors influencing visitors' satisfaction and are reflected in the vocabulary of their experiential comments. These multi-dimensional sub-dimensions of perceived value can also be considered "Themes" [43]. The study used online visitor reviews of five folk museums from three social media platforms as samples. An LDA model was constructed using Python's Gensim library, and the model's validity was assessed using coherence and perplexity metrics. Subsequently, based on Theme word frequency and semantic network analysis, the research explored the sub-dimensions of visitors' perceived value and their internal relationships when visiting folk museums.

Table 2. Textual validation of high satisfaction scores and positive cultural communication willingness.

Dimension of cultural communication willingness	Willingness tendency	Coding definition	Keywords/ linguistic cues	Representative tourist comment
Explicit recommendation willingness	Cultural recommendation	Clearly recommending others to visit	worth a visit, worth seeing, can go and have a look, highly recommended, suitable for check-in, must visit, do not miss, friends can go	"Friends who like museums can stop by and have a look."
Implicit willingness for education and sharing	Intergenerational inheritance	Cultural transmission for parent-child or descendant education	tell children, learn traditions, tell stories, education through entertainment, accompany children	"Highly recommended for children to visit. It can increase their knowledge and is quite good."
	Knowledge sharing	Explicit willingness to share knowledge through learning, understanding, and popularization	broaden horizons, popular science/ knowledge dissemination, rewarding experience	"The intangible cultural heritage and old crafts of Nanjing are worth a visit."
	Cultural spirit	Recommendation based on experiences such as praying for blessings, worship, spiritual calm, or cultural immersion	pray for blessings, effective, calm the mind, cleanse the soul, feel tradition, worship	"You can go in and cleanse your soul for a while, and briefly stay away from the troubles of this world."
	Aesthetic dissemination	Recommendation based on photography, attractive visuals, cultural products, or architectural aesthetics	good for photos, photogenic, attractive cultural products, ancient architecture, atmosphere for check-in	"There is also a cultural and creative area downstairs after leaving the venue, where you can buy cultural products and get stamps. I recommend everyone to try the AR dynamic stamp."

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However, merely identifying the perceived Themes and value dimensions of visitors to folk museums is insufficient to uncover the complex mechanisms through which these perceived value dimensions influence the formation of strong cultural dissemination intentions post-visit. By using the Themes extracted by LDA as antecedent conditions for fuzzy-set Qualitative Comparative Analysis (fsQCA), the study can more thoroughly investigate the complex causal relationships leading to specific outcomes [44]. Therefore, this study employs the Theme word frequencies extracted by LDA as condition variables and visitors' post-visit satisfaction ratings as the outcome variable, utilizing fsQCA 4.1 software to analyze and deeply explore the complex mechanisms through which perceived value dimensions influence the formation of strong cultural dissemination intentions after visits. This approach not only fully elucidates the complex mechanisms by which perceived value dimensions affect visitors' cultural dissemination intentions during folk museum visits but also provides scientifically reliable recommendations for enhancing other cultural tourism destinations (Fig 1).

Analysis of Research Results

Modeling the Perceived Value Themes of Visitors to Folklore Museums

Frequency Statistics of Online Visitor Comments. In the online comments visitors provide, the frequency of word occurrences reflects the significance of perceived values and influences overall tourist satisfaction. The study conducted high-frequency word statistics on a total of 5,936 valid comments from five folk museums, extracting the top 60 word pairs (Table 3) and creating a word cloud for high-frequency terms (Fig 2).

Analysis of the frequency statistics and the word cloud reveals that visitors most significantly perceive the historical and cultural context embodied by the museums and their exhibition themes. Words such as "folklore," "museum," "culture," "history," "exhibition," "East Yue," "Taoism," "Ninety-Nine," and "cultural relics" appear frequently and attract considerable attention. Following this, there is a notable focus on the geographic attributes of the museums and the various sensory experiences encountered during visits, with terms like "Nanjing," "Beijing," "Yue Temple," "former residence," "architecture," and "Gan Family" appearing frequently in the comments. Additionally, high-frequency words such as "worth," "very," "not bad," "take a look," "relatively," "introduction," and "like" suggest a diversity of visitor mindsets throughout the visiting process. Moreover, words like "ticket," "display," "free," "time," "nearby," "convenient," along with "traditional," "children," "folk," "courtyard," "performance," and "Velvet flower" encapsulate perceptions of convenience, time, and economic aspects of the visit, as well as perceptions regarding local cultural experiences.

Semantic Network Analysis of Visitor Comments. To gain deeper insights into the interrelationships among the perceived content during visits to folklore museums, the study conducted a semantic network analysis based on the frequency statistics of online comments, utilizing Gephi software for visualization (Fig 3). The density and color intensity of the connecting lines between words represent the closeness of their correlations. At the same time, the centrality of the nodes indicates the significance of the respective words in the perceived context.

The words "folklore," "culture," "Yue Temple," "Nanjing," and "Beijing" emerge as the most correlated nodes, with secondary nodes including "architecture," "Ganxi," "Taoism," "traditional culture," "located in," "experience," and "history." Combining these findings with the high-frequency word statistics indicates that folklore museums' geographical and cultural attributes often permeate through historical architecture, environmental settings, the journey of exploration, religious beliefs, sensory experiences, and emotional responses. This emphasizes the living imprints of local people and the spirit of folklore culture to visitors, making the museums suitable for various types of tourist visits and experiences.

Mapping the Perceived Value Dimensions of Visitors to Folklore Museums

LDA Modeling and Theme Extraction. To extract Themes from visitors' online comments on folk museum tours using the LDA model, it is necessary to evaluate the model's effectiveness with coherence and perplexity metrics. Perplexity measures how well the model fits new data, with lower values indicating better explanatory power. However, relying solely

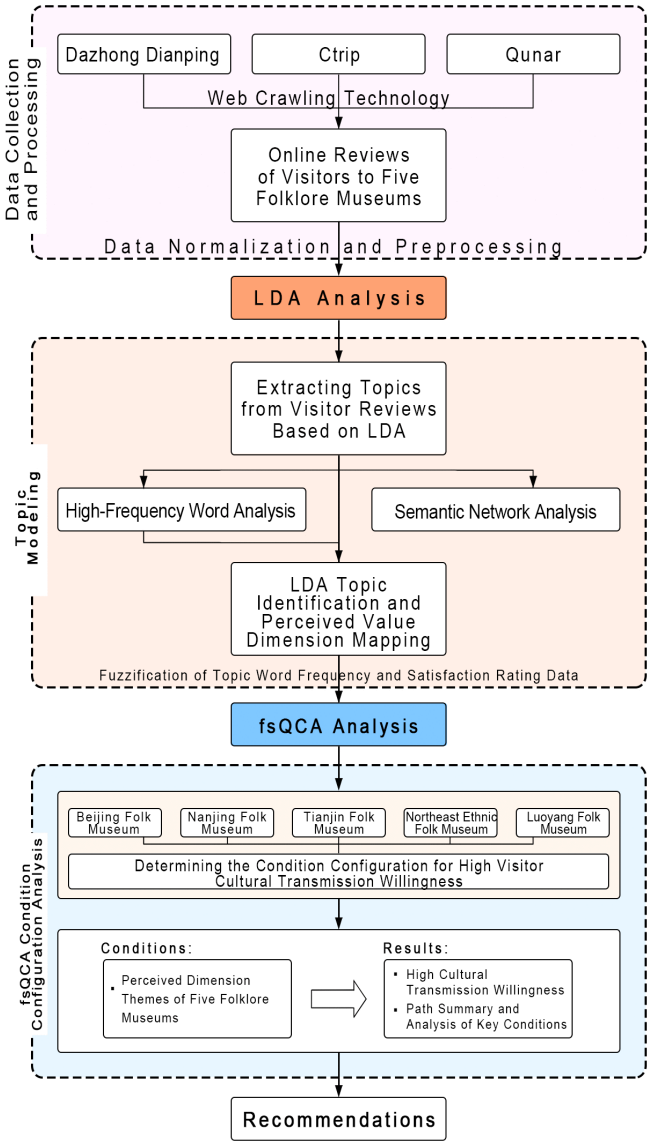


Fig 1. Research Process Framework.

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on perplexity can lead to semantic incoherence within Themes. Therefore, assessing the model using both coherence and perplexity metrics together provides a more scientifically sound evaluation [45]. Thus, a combined assessment using coherence and perplexity metrics is more scientifically sound. A higher coherence score indicates a stronger relationship and tighter connection between words within a theme, enhancing the model's interpretability and practical significance. Following Griffiths et al., α and β were set to 0.1 and 0.01, respectively; testing larger or smaller values yielded minimal improvements in theme quality [12,46]. For the number of themes (K), we examined values from 2 to 20. As shown in Fig 4, perplexity declines with increasing K but exhibits a clear elbow at K = 8 before leveling off. Coherence simultaneously peaks at K = 8 (0.725), indicating the highest intrathematic semantic cohesion at this point.

Table 3. Statistical table of high-frequency words from online reviews of visitors to five folklore museums.

Number	High-Frequency Words	Frequency	Number	High-Frequency Words	Frequency	Number	High-Frequency Words	Frequency
1	Folklore	3230	21	Display	609	41	Courtyard	422
2	Museum	2861	22	Traditional	602	42	Performance	411
3	Yue Temple	2465	23	Take a Look	597	43	Scenic Spot	410
4	Nanjing	1892	24	Temple Fair	594	44	Entrance	409
5	Beijing	1502	25	Comparison	558	45	Northeast	405
6	Former Residence	1502	26	Activities	545	46	Content	400
7	Local	1054	27	Introduction	537	47	Experience	385
8	Architecture	990	28	Children	536	48	Velvet flower	384
9	Culture	958	29	Gan Family	531	49	Located	379
10	History	929	30	See	526	50	Folk	378
11	Exhibition	919	31	Various	525	51	Open	377
12	Admission Ticket	901	32	Ninety-Nine	504	52	Transportation	373
13	Very	895	33	China	477	53	Folk Culture	364
14	Taoism	841	34	Enter	474	54	Interesting	356
15	Worthwhile	741	35	Like	473	55	Residence	334
16	Good	735	36	Free	465	56	Nearby	326
17	Visit	710	37	Ganxi	465	57	Cultural Relics	325
18	East Yue	661	38	Emperor	464	58	Recommendation	321
19	Understand	639	39	Time	457	59	Convenient	319
20	Feel	627	40	Characteristics	448	60	Preservation	317

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Fig 2. Word Cloud of High-Frequency Words.

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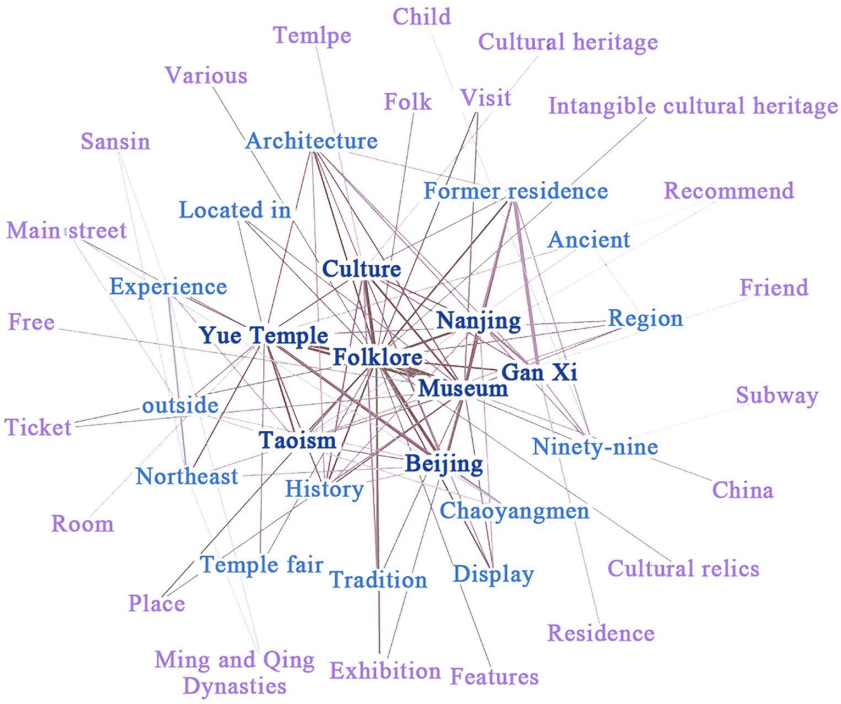


Fig 3. Semantic Network Diagram.

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This conclusion aligns with the clustering visualization. Among the solutions with comparatively lower perplexity, the eight-theme model demonstrates the clearest and most interpretable distribution. When K exceeds eight, redundant themes with overlapping content emerge, whereas the seven-theme solution exhibits markedly weaker explanatory power and lexical cohesion. Thus, we fixed K at 8, yielding the eight themes reported later (Theme 1 through Theme 8).

To secure objective and reliable Theme labels, we adopted Blei and Griffiths' recommended procedure that combines independent naming with consensus building. Two researchers first labeled each Theme independently, strictly adhering to keyword rankings and intrinsic logical relations while minimizing bias from personal academic backgrounds. Each label was required to exhibit a clear semantic relationship with at least the top twenty keywords in its Theme. A third researcher then joined the deliberation to resolve discrepancies or ambiguities. Through iterative discussion, the team reached consensus on the final labels (Table 4).

Theme 1, "Cultural Heritage and Traditional Experience," primarily focuses on traditional culture, folklore, heritage preservation projects, and visitor experiences. High-frequency words such as "paper-cutting," "Hanfu," "drama," and "history" signify visitors' interest in historical culture and interactive experiences, as well as their potential concern for the protection and transmission of traditional culture. Theme 2, "Tourist Attractions and Visiting Experience," emphasizes the folklore museums' sightseeing arrangements and display layouts. Words like "scenery," "ticket," "courtyard," "reservation," "visit," and "cultural depth" objectively describe the specific circumstances of the visitation process and surrounding environment. Theme 3, "Family and Children's Visits," highlights the activity experiences of parents and children when folklore museums serve as family outing destinations. Terms such as "children," "minors," "free," "park," "games," and "parents" reflect visitors' attention to cultural experiences and activities that are friendly to children and family interactions. Theme 4, "Food and Local Specialties," primarily reflects visitors' focus on local cuisine while visiting folklore museums, as well as the experiences of local residents regarding travel. Words like "taste," "delicacies," "specialty," "weekend," "friends,"

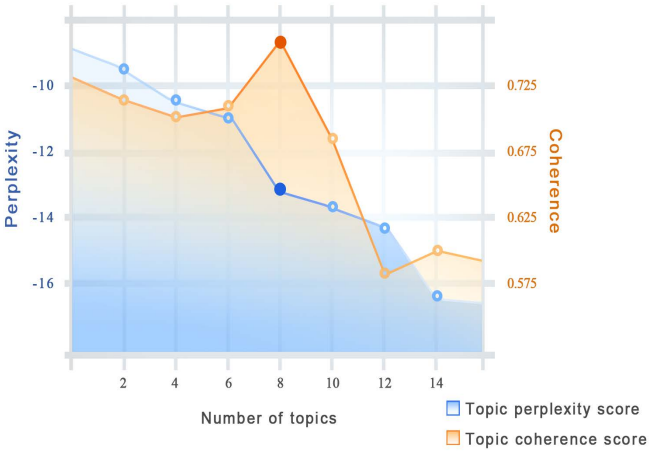


Fig 4. Results of Perplexity and Coherence Scores for Different Numbers of Themes.

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Table 4. LDA theme classification and keywords.

Theme description	Theme description	Representative keywords
Theme 1 Cultural Heritage and Traditional Experience	Related to projects and experiences associated with traditional culture, folklore, and heritage protection,etc.	culture, tradition, ancient, history, Hanfu, opera, folk culture, Northeast.
Theme 2 Tourist Attractions and Visiting Experience	Related to sightseeing and aesthetic experiences at tourist attractions,etc.	attractions, scenery, museum, tickets, courtyard, places, visiting, views, style, cultural connotation.
Theme 3 Family and Children's Visits	Related to family outings and child-friendly activities,etc.	children, kids, small courtyard, minors, experience, park visits, games, parents
Theme 4 Food and Local Specialties	Related to local food culture and social outings,etc.	taste, food, convenience, specialty, tradition, culture, weekends, friends
Theme 5 Transportation and Geographic Location	Related to transportation facilities around attractions and travel apps,etc.	subway, bus, parking, navigation, location, map, entrance, taking the subway
Theme 6 Visiting Atmosphere and Feelings	Related to visitor emotions and the overall atmosphere,etc.	feeling, pleasant, possible, worthwhile, interesting, experience, grandeur, very
Theme 7 Architecture and Environment	Related to architectural styles and design, as well as environmental details,etc.	houses, rooms, private, exquisite, details, style, courtyard, garden, characteristics
Theme 8 Practical Tips and Travel Suggestions	Related to travel tips, money-saving suggestions, and practical advice,etc.	tips, Line 1, discounts, student ID, free, advance, easy to find, advance reservation

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and "culture" capture visitors' emphasis on culinary cultural experiences and leisurely social activities during their travels. Theme 5, "Transportation and Geographic Location," emphasizes the perceived experience provided by the geographical accessibility of folklore museums. Words such as "subway," "bus," "parking," "navigation," "location," and "entrance" indicate visitors' concerns about surrounding transportation facilities and their need for directional guidance. Theme 6, "Visitation Atmosphere and Feelings," primarily underscores visitors' emotions and sensory experiences while visiting

folklore museums. Terms like “pleasant,” “can,” “worth it,” “interesting,” “experience,” and “imposing” reflect visitors’ focus on sensory comfort and the atmosphere of the venue during their visits. Theme 7, “Architecture and Environment,” centers on the architectural style, environmental design, and appreciation of details in folklore museums. Words like “houses,” “rooms,” “private,” “style,” “courtyard,” and “garden” illustrate visitors’ attention and interest in environmental design and the historical significance of architecture during their exploration. Lastly, Theme 8, “Practical Tips and Travel Suggestions,” focuses on the travel processes, relevant advice, and information visitors consider while visiting folklore museums. Words such as “tips,” “line 1,” “discounts,” “student ID,” “free,” “in advance,” “easy to find,” and “reservation” highlight visitors’ emphasis on the smoothness of the travel process, as well as their key concerns regarding transportation planning and visitation preparation.

Mapping LDA Themes to Perceived Value Dimensions. The eight salient themes identified via LDA jointly constitute visitors’ perceived value during folklore museum visits, thereby shaping their willingness to engage in cultural communication. As a dynamic construct underlying tourist behavior, perceived value is typically comprised of multiple dimensions [47]. Early work by Sheth et al. provided the foundational typology for these dimensions, decomposing perceived value into functional, social, emotional, epistemic, and conditional components based on sociological and psychological perspectives. Building on this framework, Sweeney and Soutar developed the PERVAL scale, streamlining the construct into four dimensions—quality, price, emotional, and social—widely adopted in retail contexts [18,19]. Notwithstanding these established categories, perceived value remains highly sensitive to situational and affective contexts, evolving with regard to the specific consumption setting under investigation.

In the tourism and consumer domains, successive studies have further enriched the dimensional structure of perceived value. For instance, Um et al. demonstrated in destination transformation research that among functional, conditional, cognitive, and conditional values, the conditional dimension exerts a notably strong influence on tourist attitudes, with functional value reflecting perceived infrastructure quality and conditional value representing post-experience feelings [48]. Similarly, Zhou et al. found in ancient-city tourism that functional value (experiential facilities), emotional value (interest and affective arousal), and social value (interactivity and immersion) jointly shape destination loyalty [49]. Consequently, perceived value dimensions can vary considerably subject to differing research subjects and contexts. While Theme modeling effectively uncovers clusters of high-frequency keywords, it does not inherently provide the conceptual structure of perceived value. Therefore, to examine how perceived value influences cultural communication willingness during folklore museum visits, we drew on sampled comments containing the top-ranked keywords for each Theme. Two coders with backgrounds in tourism research performed independent coding, calculated inter-coder reliability, and resolved discrepancies through discussion, thereby mapping thematic perceptions onto analytically meaningful value dimensions.

In Phase 1, we randomly sampled three to five comments per Theme that contained any of the top twenty keywords and categorized them to preserve the contextual semantics of each theme. Recognizing that Chinese keywords often derive interpretive strength from context, retaining the original remarks helps strengthen the linkage between themes and value dimensions. In Phase 2, the two coders independently categorized keywords based on their contextual cues, guided by constant comparison and iterative cross-referencing with relevant literature to maintain conceptual consistency. In Phase 3, we calculated the mapping results. When a theme corresponded to multiple value dimensions, we recorded the dimension most directly related to the theme’s core content. Cohen’s kappa served as the reliability indicator for coding consistency; with values ranging from 0 to 1, a kappa above 0.8 typically signifies a reliable outcome [50]. The preliminary results showed that seven of the eight themes achieved kappa coefficients above 0.8, indicating strong agreement. For the theme that fell below this threshold, the researchers convened with both coders, revisited the contextual text, and refined the conceptual definitions to finalize the mapping between the eight perceived themes and five value dimensions (Fig 5).

Cultural value, a key focus in tourism research, often manifests in authentic cultural heritage experiences during museum visits, influencing visitors’ cultural identity and satisfaction [3]. The thematic modeling results indicate that “Cultural Heritage and Traditional Experience” (Theme 1) is central to visitors’ perceptions of cultural value. The experience

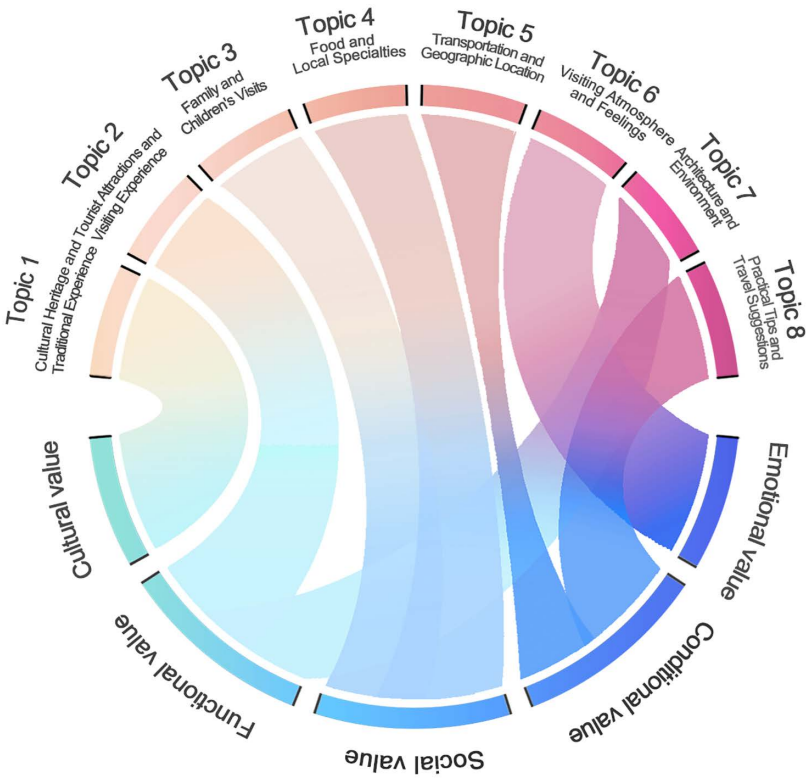


Fig 5. Mapping of LDA Themes to Perceived Value Dimensions.

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of cultural context, presentation of heritage artifacts, and representation of historical carriers are crucial focal points for visitors and serve as core sources of their cultural identity.

Within tourism settings, functional value derives from the utility that products or services provide to customers, emphasizing objective functionality and practical benefits [51,52]. In tourism research, functional value is typically employed to gauge the quality, accessibility, and practical experience of tourism facilities. For instance, Zhao et al. treat functional value as a dimension of cultural tourism perception and argue that enhancing experiential evaluations can bolster destination reputation [52]. Because architecture constitutes the most prominent functional structure of a museum, its aesthetic characteristics and materiality directly shape visitor perceptions. Moira et al. find that architecture integrating both elegant design and complete functionality can strongly influence perceived value [53]. In folklore museum visits, properties such as viewing design, facility services, itinerary arrangements, architectural details, and surrounding environments—captured in Theme 2 Tourist Attractions and Visiting Experience and Theme 7 Architecture and Environment—create functional value for visitors. These themes also reflect visitors' implicit weighing of experiential quality against the effort invested in their visits.

Social value is defined as the perception of the social attributes of products, referring to their ability to meet customers' psychological or social needs [19]. In museum tourism, social value is often reflected in the impact of group activities and social interactions. Cultural activities rooted in social identity are core to social value in museum visits. Both "Family and Children's Visits" (Theme 3) and "Food and Local Specialties" (Theme 4) emphasize the social attributes of visitors, focusing on interactive experiences during folk museum visits with families or friends and highlighting perceptions related to cultural activities and food services. This underscores the significant role of social value in visitors' museum experiences.

Emotional value develops from consumers' affective experiences and emotional utility [19]. It refers to the emotional benefits gained during consumption, including pleasure, excitement, or other affective states. Kim et al. suggest that when customers perceive value associated with a particular emotion—positive or negative—after consuming a product or service, their subsequent behavioral intentions are influenced [54,55]. In the museum context, evoking and shaping visitors' emotional experiences is pivotal. Theme 6 Visiting Atmosphere and Feelings captures precisely this dimension: the affect-laden descriptions and evaluative statements in user reviews illustrate visitors' emotional assessments of folklore museum experiences.

Conditional value is associated with specific contexts such as price, location, and other external conditions. In tourism, conditional value typically relates to the perceived convenience and situational aspects of travel, including itinerary planning, cost efficiency, and overall travel smoothness [54,55]. Um et al., for example, define conditional value as visitors' evaluations of their experiences following tourism gentrification [48]. Zhu et al., studying VR tourism, interpret conditional value as the perceived ease or congestion of the virtual visit [56]. In the folklore museum setting, Theme 5 Transportation and Geographic Location and Theme 8 Practical Tips and Travel Suggestions most closely align with conditional value. They encompass travelers' perceptions of itinerary information, assessments of travel conditions, surrounding transportation, and pre-trip preparations—highlighting the importance of travel information and accessibility, while also reflecting visitors' evaluations of the overall travel experience.

The Impact of Perceived Value Configurations on Visitors' Willingness to Engage in Cultural Transmission During Folklore Museum Visits

To further explore how the perceived value of visitors during folklore museum visits influences their willingness to engage in cultural transmission, this study is based on the LDA thematic modeling results, extracting the frequency of themes and satisfaction ratings from online comments by visitors, followed by calibration and analysis of the data variables.

Pathway Analysis of Configurations. Before calculating the configuration path results, data calibration was performed using cross anchors at 95%, 50%, and 5%, following the Direct Method recommended by fsQCA practice guidelines and Ragin [57]. On one hand, visitor comments are not standardized data formats, making external calibration norms inapplicable. On the other hand, employing the Direct Method for data calibration effectively supports the expansion and validation of subsequent research.

The rationale for selecting these specific cross-anchors is based on both the rigor of the calibration process and the empirical distribution of our percentile data. Word frequency, particularly within unstructured text data, effectively reflects the psychological states, cognitive patterns, and perceptual intensities of individuals [58]. Zipf's law suggests that word frequencies in text typically follow a long-tail (or power-law) distribution, implying that high-frequency terms represent prevalent and salient perceptions among the tourist population, whereas low-frequency terms correspond to marginal or latent perceptions [59,60]. Furthermore, the Means-End Chain Theory (MEC) posits that terms frequently mentioned in reviews can be viewed as indicators of the specific attributes, functional benefits, or psycho-social values perceived by visitors, which are deeply connected to their individual value systems [61,62]. Higher word frequency signifies that the underlying attribute, benefit, or value is more prominent and critical in the visitor experience, serving as a goal through which individuals realize their personal values. Consequently, the appearance of these high-frequency terms in online reviews constitutes the core content of visitors' explicit perceptions.

In summary, the adoption of percentile-based anchors is theoretically and empirically justified, as it allows for a clear definition of membership degrees in fuzzy sets. Specifically, the 95th percentile anchor is defined as the 'full membership' threshold, capturing the highest frequency terms that clearly represent strong and highly salient perceptions of corresponding value dimensions—such as intense visitor engagement with specific cultural features or functional utilities. Conversely, the 5th percentile anchor is defined as the 'full non-membership' threshold, representing extremely low frequencies that indicate imperceptible or absent perceptions during the visit. Based on this, we conducted a sensitivity

analysis at the 75th percentile; however, we found that the frequencies at this level still contained a degree of ambiguity. In comparison, the 95th percentile anchor provides a more precise and conceptually persuasive threshold for 'full membership' (Table 5).

After calibration, the study conducted a necessary condition analysis to preliminarily assess the necessity of each condition variable, determining whether any decisive conditions exist that constitute visitors' high willingness for cultural dissemination. Additionally, based on the consistency and coverage values obtained, the degree to which each solution is a subset of the path and the extent to which each solution covers (or explains) the outcome were measured. By ensuring the interpretative power of the results, the complex configurations that lead to high willingness for cultural dissemination among visitors after touring the folk museum were thoroughly interpreted.

Necessary condition analysis not only measures the explanatory power of individual condition variables on the outcome variable but also prevents the simplification of necessary conditions as logical remainders in subsequent calculations [63]. In the necessary condition analysis results, if a variable's consistency exceeds 0.9, it is considered a necessary condition for the outcome. The study found that none of the condition variables surpassed the necessary threshold of 0.9, indicating that no single perceived value dimension determines whether visitors have high or low willingness for cultural dissemination (Table 6). Notably, "Cultural Heritage and Traditional Experience" (Theme 1) and "Transportation and Geographic Location" (Theme 5) both exhibit consistency and coverage above 0.70 in predicting high willingness, suggesting they exert relatively stronger influence than other conditions.

The necessity analysis indicates that visitors' high cultural transmission willingness after visiting folklore museums arises from the combined influence of multiple perceived value dimensions. Therefore, the study employed the "Truth Table Algorithm" tool within the fsQCA software under "Analyze" to construct a truth table for predicting outcomes. The results demonstrate that the consistency of the overall solutions exceeds the threshold of 0.8, and the coverage also surpasses the threshold of 0.5, confirming that the overall configurations possess high explanatory power (Table 7). To address limited diversity and logical contradictions observed in the truth table, we drew on the counterfactual reasoning approaches recommended by Ragin and Barry. In integrating the parsimonious and intermediate solutions, we introduced practice-based and logical supplements; for example, in the only truth-table row yielding a "good" outcome yet not achieving high cultural communication willingness and exhibiting a configurational contradiction, cases with the "Architecture and Environment" theme absent—while all other values were present—were retained as part of the "good" configuration, whereas cases with thematic absence elsewhere were excluded. Considering the empirical cases and parsimonious solution results, we nonetheless maintained the view of its important influence. Notably, the results across all three solution types—complex, parsimonious, and intermediate—are consistent. This indicates that the intermediate solutions were not altered by directional expectations or the introduction of counterfactual reasoning, thereby confirming that the observed

Table 5. Data distribution and calibration anchors.

Variables/Outcome	Mean	S.D.	Full Out (5%)	Crossover (50%)	Full In (95%)
Cultural Heritage and Traditional Experience	1.67	0.36	0.92	1.72	2.22
Tourist Attractions and Visiting Experience	1.05	0.19	0.70	1.10	1.36
Family and Children's Visits	0.37	0.19	0.06	0.36	0.76
Food and Local Specialties	0.57	0.19	0.27	0.60	0.76
Transportation and Geographic Location	0.68	0.20	0.25	0.71	0.99
Visiting Atmosphere and Feelings	1.12	0.20	0.77	1.15	1.44
Architecture and Environment	0.75	0.20	0.50	0.72	1.25
Practical Tips and Travel Suggestions	0.32	0.17	0.05	0.31	0.61
Satisfaction	35.4	12.75	7.25	40	50

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Table 6. Single variable necessity test.

Condition Variables	High Willingness for Cultural Communication		~High Willingness for Cultural Communication	
	Consistency	Coverage	Consistency	Coverage
CHTE	0.737	0.713	0.613	0.586
~CHTE	0.572	0.599	0.700	0.724
TAVE	0.663	0.683	0.644	0.657
~TAVE	0.667	0.655	0.689	0.669
FCV	0.653	0.650	0.696	0.686
~FCV	0.685	0.695	0.645	0.648
FLS	0.678	0.661	0.644	0.622
~FLS	0.612	0.635	0.649	0.666
TGL	0.720	0.703	0.629	0.608
~TGL	0.599	0.620	0.693	0.710
VAF	0.664	0.671	0.652	0.652
~VAF	0.656	0.655	0.672	0.664
AE	0.646	0.687	0.606	0.637
~AE	0.659	0.628	0.702	0.662
PTTS	0.652	0.644	0.678	0.663
~PTTS	0.660	0.675	0.636	0.644

Note: CHTE = Cultural Heritage and Traditional Experience, TAVE = Tourist Attractions and Visiting Experience, FCV = Family and Children's Visits, FLS = Food and Local Specialties, TGL = Transportation and Geographic Location, VAF = Visiting Atmosphere and Feelings, AE = Architecture and Environment, PTTS = Practical Tips and Travel Suggestions. Boolean Algebra Logic Operations. The symbol "~" denotes the set relationship of "not" or "negation."

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Table 7. Perceived value configuration pathways based on intermediate and parsimonious solutions.

Condition Variables	Intermediate solution pathways						Parsimonious solution pathways		
	1	2	3	4	5	6	1	2	3
CHTE	●			●	●	●	●	●	
TAVE			●	⊗	⊗	●	●		
FCV	●	⊗	⊗		●	●		●	⊗
FLS	⊗	●	⊗	⊗	●	●		●	●
TGL	●			●	●	●	●	●	
VAF	⊗		●	●		●			●
AE	●	●	●	●		⊗		⊗	●
PTTS	●			⊗		●			
Raw coverage	0.302	0.246	0.241	0.334	0.356	0.347	0.508	0.466	0.421
Unique coverage	0.013	0.033	0.017	0.013	0.017	0.011	0.064	0.036	0.026
Consistency	0.962	0.958	0.967	0.959	0.958	0.951	0.926	0.953	0.911
Solution consistency	**0.915**						**0.894**		
Solution coverage	**0.714**						**0.657**		

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configurational structures are robust. There is no substantive conflict between our theoretical derivations and the empirical results, which ensures the alignment between real-world cases and theoretical logic (Table 8). Consequently, among the three configurational patterns revealed by the analysis, we focus primarily on the comparison between parsimonious

Table 8. Comparative Paths of Complex Solutions Consistent with Intermediate Solutions.

Condition Variables	Intermediate solution pathways						Parsimonious solution pathways		
	1	2	3	4	5	6	1	2	3
CHTE	●			●	●	●	●	●	
TAVE			●	⊗	⊗	●	●		
FCV	●	⊗	⊗		●	●		●	⊗
FLS	⊗	●	⊗	⊗	●	●		●	●
TGL	●			●	●	●	●	●	
VAF	⊗		●	●		●			●
AE	●	●	●	●		⊗		⊗	●
PTTS	●			⊗		●			
Raw coverage	0.302	0.246	0.241	0.334	0.356	0.347	0.508	0.466	0.421
Unique coverage	0.013	0.033	0.017	0.013	0.017	0.011	0.064	0.036	0.026
Consistency	0.962	0.958	0.967	0.959	0.958	0.951	0.926	0.953	0.911
Solution consistency	**0.915**						**0.894**		
Solution coverage	**0.714**						**0.657**		

Note: "●" = existence of core conditions, "•" = existence of edge conditions, "⊗" = edge conditions missing, "ⓧ" = core conditions missing, blank indicates that the condition has no effect.

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and intermediate solutions. By identifying core and peripheral conditions, we delineated the perceived value configuration pathways that lead to high cultural communication willingness following folklore museum visits. Based on the driving effects of these core conditions and the efficacy of their respective value dimensions, we have classified these pathways into three distinct perceived value-driven models.

Robustness Testing. To ensure the reliability of the study's findings, robustness of the configurations was assessed by adjusting the consistency threshold and recalibrating the anchors. Following recommendations from previous research [64], the consistency threshold was increased from 0.8 to 0.85. This adjustment did not produce significant changes in the configuration paths, maintaining consistency with the original configurations. Additionally, based on Fiss et al., the calibration anchors were modified from 95%, 50%, and 5% to 90%, 50%, and 10%, and the configuration analysis was repeated [64]. The resulting configuration paths remained consistent with the original interpretations. Therefore, the robustness checks confirmed the stability and reliability of the study's results.

Conclusions and discussion

By analyzing online comments from visitors to five Chinese folk museums, the study employed the LDA method to identify key themes in visitor perceptions during museum visits and mapped these to corresponding perceived value dimensions. Subsequently, fsQCA was used to conduct an in-depth analysis of the conditional configurations through which visitor perceptions influence their willingness for cultural dissemination, resulting in the extraction of eight significant visitor perception themes.

Eight perceived themes of visitors during folklore museum visits

Theme 1 (Cultural Heritage and Traditional Experience) underscores visitors' emphasis on culturally significant and interactive heritage rather than merely aesthetic artifacts. Lydia and Alicia argue that cultural experiences are key motivations for museum visits and crucial for fostering identity and cultural recognition across diverse backgrounds [65,66]. The richness of cultural heritage greatly influences visitors' assessments of ticket prices and geographical locations.

Theme 2 (Tourist Attractions and Visiting Experience) and Theme 7 (Architecture and Environment) reveal that visitors are concerned with objective perceptions and their environments. Static attributes during visits impact satisfaction and play an essential role in fostering cultural transmission willingness. Goulding et al. note that clear information delivery, smooth navigation, and diverse environmental experiences enhance functional value and generate positive emotions [67]. Conversely, a lack of personal space and chaotic layouts can lead to negative emotions affecting subsequent behaviors.

Theme 3 (Family and Children's Visits) emphasizes that parent–child interactions in folklore museums are crucial, as family groups represent a significant visitor segment. Research by Andre and Massarani demonstrates that museums serve as important educational venues for children to gain knowledge, enhance learning abilities, and improve family engagement [68,69]. Exploring folklore museums' cultural and educational potential is a vital avenue for enhancing visitors' perceptions of social value. Theme 4 (Food and Local Specialties) includes aspects related to travel timing and preferences for companions, suggesting that shaping interactive and shared experiences within a common social background leaves a lasting impression on visitors. The close connection between folklore museums and daily life makes food experiences a prominent aspect of the visits. Zhu et al. confirm that culinary experiences are essential in enhancing tourist destinations' competitiveness, as enjoyable sensory memories can lead to more enduring local cultural recollections and consequently result in more positive travel outcomes [70].

Themes 5 (Transportation and Geographic Location) and 8 (Practical Tips and Travel Suggestions) reflect that transportation facilities, geographic location, and travel conditions are focal points of visitors' attention during their visits. The convenience of the destination and the dissemination of travel information influence the smoothness of the visit, while richer travel suggestions significantly enhance visitor perceptions. Chowdhury and Virkar note that destination accessibility and rest facilities are critical factors in determining whether visitors will return, while the application of new technologies in transportation systems not only increases visitor mobility but also plays a crucial role in enhancing their perceived conditional value [71,72].

Theme 6 (Visitation Atmosphere and Feelings) shows that a specific cultural atmosphere can evoke significant emotional responses. This factor, in conjunction with other perceived themes, enhances visitor satisfaction and willingness for cultural transmission. Xu et al. note that emotional experiences are often a primary objective during visits, along with physical activity and travel memories, impacting subsequent behavioral intentions [73]. For visitors with varying educational backgrounds, integrating display modes and environments effectively enhances emotional responses compared to merely improving verbal explanations and services [73].

Five mapping relationships between visitor perception themes and value dimensions

In the context of folklore museum visits, eight perceived themes significantly influence visitor satisfaction and their willingness to engage in cultural transmission. By reviewing the evolving definitions of perceived value and examining the core elements of visitor perception, the study categorizes these themes into five dimensions: cultural, functional, social, emotional, and conditional value. This framework aligns with findings by Zang and Karakan, yet diverges from Deng et al. (2023) who emphasize hedonic value in online museum settings—likely reflecting differences between virtual and tangible experiences [74–76].

Theme 1 "Cultural Heritage and Traditional Experience," as the perceived core of cultural value, exhibits consistency and coverage above 0.70 in the necessity analysis. The configurational paths leading to high cultural communication willingness show that the core driving role of cultural value is markedly greater than that of the other perceived values. Chen et al. likewise contend that cultural experience is a key factor enhancing visitors' qualities and prompting their willingness to disseminate culture [3]. Taken together, the intermediate and parsimonious solutions indicate that cultural value can be regarded as an "INUS" condition for achieving high post-visit cultural communication willingness. The "INUS" condition, as proposed by Mackie, refers to a factor that is insufficient but necessary within a configuration that is itself sufficient but unnecessary for the outcome. In other words, cultural value can function as a necessary condition within pathways to high cultural communication willingness, allowing the outcome to be reached more readily and directly, but still requiring the support of other perceived values.

Within the same perceived value dimension, different Themes also vary in their impact. Theme 2 and Theme 7 both operate as functional value, yet in the intermediate solution Theme 7 appears as a core condition in three paths, whereas Theme 2 is core in only one. When Theme 7 is absent as a core condition, four other core conditions are required to drive the outcome; by contrast, the absence of Theme 2 as a core condition does not produce a marked variable effect, and the parsimonious solutions likewise show that the lack of Theme 7 necessitates greater perceptual compensation. This indicates that Theme 7 (Architecture and Environment) exerts a more pronounced influence than Theme 2 (Tourist Attractions and Visiting Experience). This conclusion is corroborated by research conducted by Xu et al [73].

Within the conditional value dimension, Theme 8 does not serve as a core condition in any pathway. Conversely, Theme 5 serves as a core condition in two pathways, significantly impacting the outcomes. This conclusion is less frequently mentioned in previous studies [77]. This suggests that a museum's advantageous location offers more tangible benefits than post-construction travel recommendations. Notably, comparing the configurations of Theme 3 and Theme 4 in the pathway results, the presence or absence of these core themes does not significantly affect the conditional configurations. This suggests that family social activities and local culinary experiences have nearly equivalent influences on visitors' willingness to engage in cultural transmission after they visit folklore museums. Research by Kim et al. indicates that when visitors choose to spend time with family and friends, attractions featuring distinctive foods are prioritized as travel destinations, and shared dining experiences are critical processes for developing close social bonds [78]. Furthermore, Park et al. note that group travel or family visits are significant reasons why some visitors choose to visit museums with culinary attributes [79]. The co-occurrence of social attributes and food experiences in tourism contexts may explain the similar impacts of the themes "Family and Children's Visits" and "Food and Local Specialties" on the outcomes.

The complex mechanism of visitor perceived value affecting cultural dissemination willingness, three driving pathways, and improvement recommendations

Comparison of the conditions across configurational paths underscores the differential importance of perceived value dimensions. In the intermediate and parsimonious solutions, cultural value is the only dimension that never appears in an absent state. When cultural value operates as a core driving condition, it features in three intermediate and two parsimonious paths, all of which are the explanatory routes with the highest raw coverage. Within conditional value, although Theme 8 exhibits instances of absence, its effect on the overall condition sets is minor, whereas Theme 5 is never absent. Among the two perception themes constituting functional value, the core absence of Theme 7 has a marked impact on the configuration of conditions; while Theme 2 is absent as a core condition in intermediate Paths 4 and 5, its influence is not significant relative to other paths and the parsimonious solutions. It follows that conditional and functional value are second only to cultural value in importance for the outcome, a conclusion consistent with Chen et al [80]. By contrast, emotional value appears as a core condition only in Path 6; although Path 6, with the greatest number of core conditions among the most explanatory intermediate solutions, does not reveal a strong standalone driving role for emotional value, its combined efficacy with functional value is notably prominent in the parsimonious solution. Similarly, the presence or absence of the two themes under social value does not significantly alter the condition configurations; however, the parsimonious solutions suggest that the combinatory effect of conditional and social value is more salient. Thus, the driving force of emotional and social value is weaker than that of cultural, conditional, and functional value. Antón et al. also remarked on this point in their study of visitors' short-term behaviors after museum tours [81].

In summary, among the conditional configurations that lead to high willingness for cultural dissemination post-visit, the perceived cultural value is the most significant driving force, followed by conditional value and functional value, and then emotional value and social value. Based on these conclusions and the combinations of conditional configurations in the pathway results, the perceived value configurations that foster high willingness for cultural dissemination after visiting folk museums are summarized into three models:

1. Culture-Conditional-Functional Value Perception Driven Model.

Drawing on the configurational pathways that yield high cultural communication willingness, the parsimonious solution (Path 1) and intermediate solution (Path 4) indicate that cultural value and conditional value exhibit significant driving power. Functional value—through Themes 7 and 2—can effectively complement these pathways; the absence of either theme does not undermine attainment of the overall objective. Furthermore, the intermediate solutions (Paths 4 and 5) illustrate that when Theme 2 is absent as a core condition, social value can play a compensatory role, suggesting that subsequent pathway patterns can be flexibly adjusted in light of practical conditions. In sum, we propose a pathway model that foregrounds cultural heritage experiences, enhances transport accessibility and the functional quality of the visit and site environment, and selectively elevates perceptions of social and emotional value.

Anchored in the innovative application of cultural heritage, the core of this model is to integrate infrastructure and expand service functionality, thereby improving the museum's physical accessibility and the smoothness of visitor flow. This includes establishing seamless tourist routes connecting major urban transport hubs, optimizing surrounding parking and shuttle facilities; building cultural image recognition by excavating historical and cultural narratives and embedding them into transit visuals and information systems; refining on-site wayfinding, barrier-free facilities, and practical travel guides; and optimizing spatial layout to ensure rational visitor movement under high volumes. Enhancing functional comfort and informational convenience during folk cultural experiences will, in turn, encourage visitors to form positive cultural communication intentions.

2. Culture-Functional-Emotional Value Perception Driven Model.

Integrating the parsimonious solution (Path 3) with the intermediate solutions (Paths 3 and 4), this pathway shows that although cultural value is not as dominant as in the Culture–Conditional–Functional configuration, it remains nearly equivalent to functional value and indispensable. Functional value in these configurations often co-occurs with emotional value. Accordingly, we propose a pathway premised on the richness of cultural heritage but with heightened emphasis on visitation functionality, architectural history, and atmospheric styling to elevate perceptions of both functional and emotional value.

Grounded in cultural heritage resources, the core of this model is to prioritize architectural narrative design and the crafting of spatial ambiance. Breaking from static display modes, it deepens the affective connotation of cultural presentation through multi-sensory media such as lighting and soundscapes, enriching the diversity and layering of cultural expression within the physical space. At the same time, particular attention should be paid to constructing culturally resonant experiential spaces so that emotional expressions transcend surface-level folk artifacts, guiding visitors to forge deep affective identification and nostalgic experiences within distinctive architectural forms and richly historical atmospheres.

3. Culture-Social-Conditional Value Perception Driven Model.

Based on the parsimonious (Path 2) and intermediate (Paths 6 and 1) solutions, social value—although not decisive when absent in the intermediate solutions—can exert a clear driving effect when configured with cultural and conditional value. Paths 2 and 5 further demonstrate that when functional value cannot operate significantly, social value assumes critical importance. Therefore, grounded in cultural heritage experiences and traditional folk interaction, we propose a pathway model that emphasizes cultural interaction and accessibility, with a focus on group touring experiences and multi-point connectivity.

Leveraging interactive folk-cultural experiences and family-oriented programming, the core of this model is to create a cultural experience destination that combines transport convenience with multi-point linkage. By integrating heritage revitalization concepts with traditional handicrafts and distilling narratively rich cultural "scripts" from folk history, targeted group cultural experience projects can be developed, enabling visitors to perceive folk historical sentiments through embodied practice and social interaction, and thereby strengthening intergenerational cultural understanding.

Concurrently, enhancing dedicated facilities and transport nodes for family and group visitors, and linking to existing or potential nearby cultural tourism destinations to form a weekend cultural leisure network, will promote bidirectional integration and sustainable development of localization and globalization (Fig 6).

Conclusion

This study examines five Chinese folk museums using an integrated LDA and fsQCA approach to analyze visitor perceptions during museum visits. By aligning perceived themes with specific dimensions, the research delves into the configurational conditions that drive strong cultural dissemination intentions post-visit. This addresses a research gap regarding the internal sub-dimensions of perceived value and their complex interactions, offering a robust model for future museum management and planning, and clarifying how cultural value, alongside other perceived values, yields multifaceted impacts at cultural tourism sites.

The research broadens the scope of complexity theory and provides a comprehensive perspective on how perceived value affects visitor satisfaction and subsequent cultural dissemination. Methodologically, the combined use of LDA and fsQCA on objective online review data identifies three perceived value-driven models that enhance post-visit cultural dissemination intentions at folk museums. Enhancing the perceptual experience elevates these museums as cultural heritage platforms, thereby boosting regional economic development, reinforcing national identity, and stimulating cultural tourism consumption—all of which promote sustainable global cultural exchange.

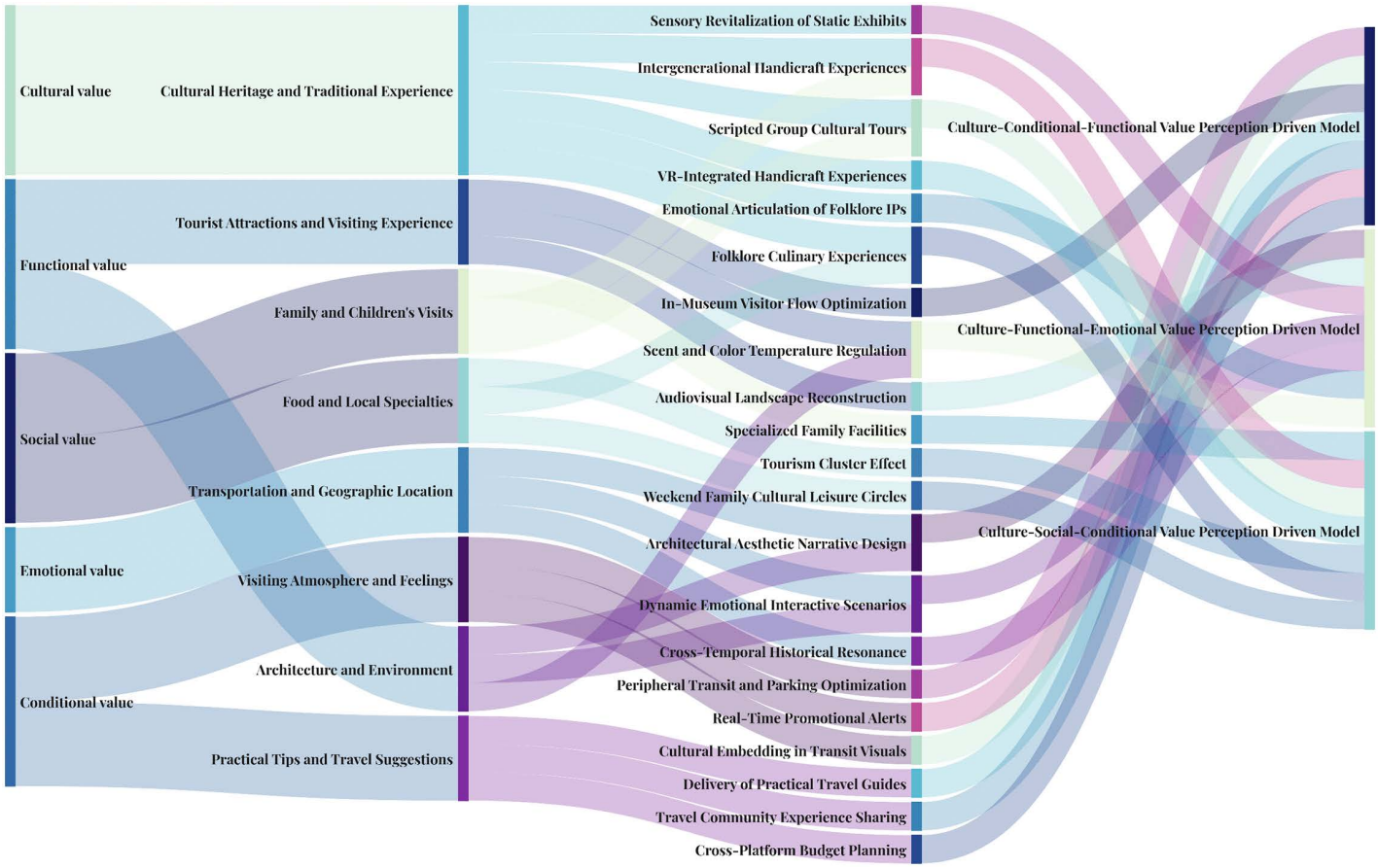


Fig 6. Recommendations for Enhancing the Model of High Cultural Communication Willingness Driven by Tourists' Perceived Value.

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It is worth noting that, given the privacy protections and constraints of online travel platforms, the results may be skewed toward younger and middle-aged cohorts with higher digital literacy. However, the perceptions of groups with lower social media engagement, such as older adults and children, are not entirely absent; they are refracted in the reviews through proxy expressions by family travel decision-makers. In addition, in the fuzzy-set calibration based on textual frequency anchors, there remains an interpretive gap and potential equivalence ambiguity between linguistic intensity in textual expression and underlying psychological perception. Future research should therefore integrate traditional psychometric scales to more precisely examine the mapping and transformation mechanisms between textual representations and latent perceptual constructs. Moreover, the study draws on online comments spanning a ten-year period, a substantial timespan. Future work could integrate survey-based data and demographic/statistical characteristics as antecedent conditions and undertake cross-sectional comparisons at different time points. Although the sample encompasses folk museums of varying grades, it is concentrated in eastern China. While perception-driving mechanisms centered on cultural value have a certain universality and extensibility in global cultural tourism, conditional and social values are more easily influenced by regional differences, which may lead to misalignments in practice. Subsequent research could therefore broaden the sampling frame and compare configurational similarities and differences across museum tiers, offering macro- and micro-level insights into the development of perception configuration applicability and the targeted optimization of museum management.

Supporting information

S1 File. Review Data.
(ZIP)

Author contributions

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