Lecture Notes in Education, Arts, Management and Social Science,
2026, Volume 4, Issue 7
https://bbwpublisher.com/journal/LNE
Online ISSN: 2705-053X
Print ISSN: 3083-1091

Research on Visitors' Perceived Value of Industrial Heritage Museums Based on the IPA Model: A Case Study of Chongqing Industrial Museum

Yuying Miao

Chongqing University of Science and Technology, Chongqing 401331, China

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: The revitalization of industrial heritage is ultimately assessed through visitors' perceived value. Taking the Chongqing Industrial Museum as a case, this study collected review texts from Dianping, Ctrip, Xiaohongshu, and other platforms. After word segmentation and theoretical coding, a seven-dimensional, 24-item perceived-value scale was developed, covering historical, cultural-educational, emotional, quality, service, social, and cost value. A paired importance–performance questionnaire was administered, yielding 410 valid responses, which were analyzed through exploratory factor analysis (EFA) and Importance–Performance Analysis (IPA). The scale showed good reliability (Cronbach's α = 0.720–0.857 for performance and 0.719–0.839 for importance), and the two rounds of EFA yielded cumulative variance explained of 70.624% and 68.426%. The mean importance scores (3.782–3.914) were systematically higher than the mean performance scores (3.520–3.711), revealing a pattern of "high expectation, low fulfillment." Historical, cultural-educational, and emotional value fell in the keep-up quadrant, cost value in the concentrate-here quadrant, quality and service value in the low-priority quadrant, and social value in the possible-overkill quadrant; B3, D1, G1, and G2 were identified as priorities for improvement. The study further finds that IPA quadrants can mask the largest expectation gap within quality value, and that the lower-importance social value still carries real experiential functions. Accordingly, the paper proposes correcting quadrant placement by the expectation gap, treating the possible-overkill quadrant with caution, and advancing enhancement paths through narrative reconstruction, supporting facility and service improvement, value-for-money rebuilding, consolidation of advantages with resource reallocation, and industry chain extension.

Keywords: Industrial heritage tourism; Visitor perceived value; Importance–Performance Analysis (IPA); Industrial heritage museum; Chongqing Industrial Museum

Online publication: July 26, 2026

1. Introduction

Industrial heritage is the material testimony of urban industrial civilization and the carrier of industrial

workers' collective memory. With the renewal of "rust belts" and the integration of culture and tourism, museums converted from disused workshops and derelict equipment have become a typical form of heritage revitalization. The Chongqing Industrial Museum, built on the site of the former Chongqing Iron and Steel (CIS) section-steel plant, opened to the public free of charge in September 2019. Its main hall retains the steel structure of an eight-bay workshop, overhead cranes and railway tracks; the "Steel Soul" hall narrates the history of the wartime industrial relocation to the west and the "saving the nation through steel" movement; and the open-air heritage park displays heavy equipment. It is a representative project of large-scale steel industrial-heritage revitalization in southwest China. Since opening, its visitor base has expanded from CIS retirees to a diversified mix of young social-media visitors, parent-child families, and study-tour groups. Problems such as relatively static exhibitions, uneven supporting facilities, and short dwell time have gradually emerged. Whether its resource advantages can be converted into market recognition ultimately depends on the value experience of visitors.

Research on industrial-heritage tourism can be traced to Edwards *et al.*'s evaluation of the tourism-development value of mining sites [1]. Chinese scholarship began by introducing the renovation experience of the Ruhr District [2] and gradually expanded to local topics such as the Third-Front Construction [3]. In terms of visitor experience, perceived value is the overall judgment formed after visitors weigh what they "get" against what they "sacrifice" [4]. Sweeney and Soutar developed it into a multi-dimensional construct comprising emotional, social, functional, and price dimensions [5]. Chinese scholars have built structural models of visitor perceived value and explored how visitors form perceptions of the value of a travel experience [6]. On this basis, multi-dimensional systems have been constructed in contexts such as ancient villages [7], national parks [8], red tourism [9], and homestays [10]. Within the industrial-heritage field, existing studies have confirmed that perceived value significantly affects post-visit behavioral intentions [11] and have measured the tourism value of different heritage sites. However, most prior studies judge performance solely by satisfaction, which makes it difficult to distinguish between genuine shortcomings—factors visitors care about but experience poorly—and over-invested items to which visitors attach little importance. Importance–Performance Analysis, which divides the plane into four quadrants with importance on one axis and performance on the other [12], can compensate for this limitation. It has been applied to ecotourism [13], mine-pit parks [14], and other settings, but remains rare in the context of industrial-heritage museums, and few studies address the tension between IPA quadrant classification and the expectation gap.

Accordingly, taking the Chongqing Industrial Museum as a case, this paper constructs a seven-dimensional perceived-value system tailored to industrial-heritage museums and conducts an IPA diagnosis based on 410 valid questionnaires, addressing two questions: at which points does the museum's value supply diverge from visitor expectations, and when IPA quadrants and the expectation gap send different signals, how should improvement priorities be determined?

2. Research design

2.1. Profile of the case site

The Chongqing Industrial Museum is located in the Yidu Ancient Town area of Dadukou District, renovated from the former CIS section-steel plant. It is one of the ten national pilot projects for the relocation and renewal of old industrial bases and one of the first batch of national industrial heritage sites. The museum comprises the main hall (the "Century Glory" hall), the "Steel Soul" hall and the open-air heritage park.

The main hall, converted from an eight-bay workshop, offers about 8,000 m² of indoor exhibition space for a comprehensive industrial-history display; the "Steel Soul" hall focuses on the century-long history of CIS and the wartime industrial relocation to the west; the heritage park preserves heavy installations and transport tracks, and its centerpiece is an 8,000-horsepower double-cylinder horizontal steam prime mover manufactured in the United Kingdom in 1905 and weighing 250 tons. Admission is free with real-name reservation; only special exhibitions and customized study-tour programs require paid entry. The museum is integrated with Yidu Ancient Town and the CIS cliffside walkway. Free admission lowers the threshold for visiting, and "keeping visitors longer and deepening their perception" has become the core operational proposition.

2.2. Indicator system and questionnaire design

The indicator system was constructed following the principles of systematicity, scientific rigor, localization, and measurability. Reviews and travel notes were collected from Dianping, Ctrip, Mafengwo, and Xiaohongshu. After Jieba word segmentation, stop-word filtering, and word-frequency statistics, the top 150 high-frequency words were extracted, semantically merged, and theoretically coded into 16 initial concepts, then cross-referenced with established scales and the museum's on-site conditions to form seven dimensions and 24 items (**Table 1**): historical, cultural-educational, emotional, quality, service, social, and cost value. The questionnaire consisted of three parts: respondents' demographics and travel behavior; a paired importance–performance scale (five-point Likert scale, 1 = very unimportant / very dissatisfied, 5 = very important / very satisfied); and overall satisfaction, revisit intention, and a multiple-choice section on improvement needs.

Table 1. Evaluation indicator system of visitor perceived value at the Chongqing Industrial Museum

Dimension	Items	Key meaning
A Historical value	A1–A4	Authenticity of industrial relics; urban industrial memory; scenario-based narrative; symbol of civilization
B Cultural-educational value	B1–B4	Perceived depth of industrial culture; perception of industrial spirit; acquisition of historical knowledge; study-tour function
C Emotional value	C1–C4	Nostalgia; pride and reverence; aesthetic appreciation of industrial heritage; resonance of collective memory
D Quality value	D1–D3	Spatial quality and supporting facilities; wayfinding signage; consistency between promotion and on-site reality
E Service value	E1–E4	Staff attitude; docent professionalism; park management and order; route diversity
F Social value	F1–F2	Facilitation of interpersonal interaction; identification with and sense of belonging to industrial culture
G Cost value	G1–G3	Perceived worth of time, money and physical/energy investment

2.3. Data source and sample

Following the convention of a sample size of 5–10 times the number of scale items, the target was no fewer than 200 responses. The survey combined online and offline channels: questionnaires were distributed on-site to visitors in the park and circulated electronically through social platforms.

A total of 410 valid questionnaires were obtained (after excluding those with excessively short completion time, patterned responses, and missing key items), equal to 17 times the number of items and thus satisfying the requirement for factor analysis. The sample was predominantly female (62.9%), with 36.8% aged 26–40; 66.3% of respondents resided in the nine central districts of Chongqing, and 60.5% held a bachelor's or associate degree. Self-driving travel was the dominant mode (44.1%), and 45.6% stayed for

1–2 hours. Visitors learned about the museum mainly through online sources, the reputation of the CIS plant, and friend recommendations. The top three travel purposes were sightseeing (57.3%), learning about CIS history (55.4%), and parent-child activities (39.8%). The aspects most in need of improvement were docent/guide services (53.2%), cultural-creative products (49.8%), and multimedia interaction (45.9%). The sample structure broadly aligns with the museum's market profile: local visitors as the mainstay, half-day trips with companions, and word-of-mouth-driven visitation.

3. Empirical results and analysis

3.1. Reliability and validity tests

Cronbach's α for the seven dimensions of the performance scale ranged from 0.720 to 0.857, and that for the importance scale ranged from 0.719 to 0.839, both above the commonly accepted 0.7 threshold, indicating good internal consistency. The KMO values for the two scales were 0.799 and 0.881, and Bartlett's test of sphericity yielded approximate chi-square values of 3973.716 and 4020.835 ($df = 276$, $P < 0.001$), confirming that the data were suitable for factor analysis. Seven common factors were extracted with eigenvalues greater than 1, accounting for 70.624% and 68.426% of the cumulative variance in the two rounds. After rotation, all 24 items loaded strongly on their hypothesized dimensions (loadings > 0.4), and the factor structure was consistent with the theoretical design.

3.2. Overall level and gap structure of perceived value

The mean importance scores of the seven dimensions ranged from 3.782 to 3.914, and the mean performance scores from 3.520 to 3.711, with overall means of 3.841 and 3.658, respectively (**Table 2**). First, the mean importance score of every dimension was higher than its performance score, with an average gap of 0.184: "high expectation, low fulfillment" is a defining feature of the experiential supply. Visitors' expectations are relatively high, and although on-site performance scores all exceed 3.5 and lean slightly positive, they do not fully meet those expectations. Second, the gaps are unevenly distributed: quality value shows the largest gap (0.300), followed by cost value (0.225) and emotional value (0.211), with cultural-educational value in the middle (0.180); historical (0.156), service (0.143), and social value (0.071) gaps are relatively small. Third, even within the advantage dimensions, there are internal gaps: emotional value ranks highest in importance (3.914) but scores only 3.703 on performance, indicating that visitors' expectations for nostalgia, pride, and resonance are the strongest, while the museum's capacity to evoke such emotions remains somewhat insufficient.

Table 2. Importance, performance, and IPA quadrant classification of visitor perceived-value dimensions

Dimension	Importance M	Performance M	Gap	IPA quadrant
A Historical value	3.849	3.693	0.156	keep up
B Cultural-educational value	3.876	3.696	0.180	keep up
C Emotional value	3.914	3.703	0.211	keep up
D Quality value	3.820	3.520	0.300	Low priority
E Service value	3.788	3.645	0.143	Low priority
F Social value	3.782	3.711	0.071	Possible overkill
G Cost value	3.861	3.636	0.225	Concentrate here
Overall mean	3.841	3.658	0.184	—

3.3. Dimension-level IPA diagnosis

Using 3.841 and 3.658 as the cut-off points, the seven dimensions fall into four quadrants (**Figure 1**). Historical, cultural-educational, and emotional value lie in the keep-up quadrant; their dual-high performance aligns with the museum's resource endowment built on authentic industrial relics and constitutes its core competitiveness. Cost value falls into the concentrate-here quadrant: its importance lies above the cut-off point while its performance falls below, forming a "highly valued but under-fulfilled" weakness. Quality and service value lie in the low-priority quadrant, among which quality value records the lowest performance score of the seven dimensions. Social value lies in the possible-overkill quadrant, with importance below the cut-off point and performance above it.

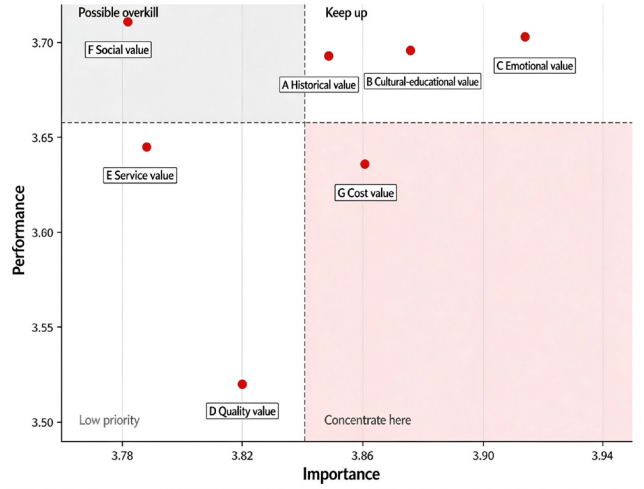


Figure 1. Dimension-level IPA quadrant diagram of visitor perceived value

3.4. Item-level IPA diagnosis

See **Figure 2**.

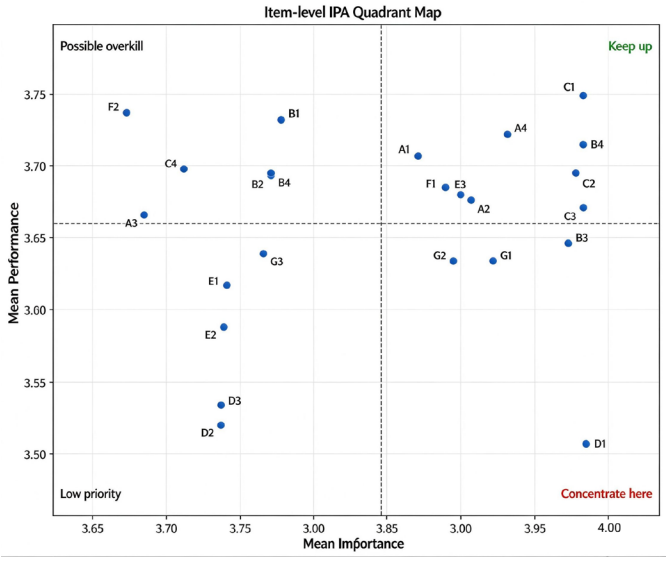


Figure 2. Item-level IPA quadrant map

Using the item-level overall means of 3.846 and 3.660 as the cut-off points, the 24 items are distributed more finely (**Table 3**). Nine items fall in the keep-up quadrant, covering authenticity of relics, century-long memory of CIS, presentation of industrial history, science popularization and study-tour education, nostalgia, pride and reverence, industrial aesthetic appeal, park order and interpersonal interaction; the museum delivers well in terms of "visible history" and "tangible atmosphere." The concentrate-here quadrant contains B3 (perception of historical and contemporary significance), D1 (spatial quality and supporting facilities), G1 (perceived worth of time invested), and G2 (perceived worth of money spent); D1 records the lowest performance score of all items. Five items lie in the low-priority quadrant, concerning clarity of signage, consistency of promotional messaging, staff attitude, docent professionalism, and physical exertion. Six items lie in the possible-overkill quadrant, involving scenario-based narrative, perceived cultural depth, testimony of industrial spirit, collective resonance, route diversity, and group identity.

Table 3. Item-level IPA quadrant assignment of visitor perceived-value items

Quadrant	Assigned items	Basic characteristics
Keep up	A1, A2, A4, B4, C1, C2, C3, E3, F1	Dual-high; source of core competitiveness; should be sustained
Concentrate here	B3, D1, G1, G2	High importance but low performance; top priority for improvement
Low priority	D2, D3, E1, E2, G3	Dual-low; improved gradually through routine management
Possible overkill	A3, B1, B2, C4, E4, F2	Performance exceeds expectations; structural rebalancing rather than cutback

4. Discussion

4.1. The shortcoming is not resource scarcity but weak transformational capacity

The museum possesses rare large-scale steel relics, a complete industrial-history narrative, and national-level exhibition honors. Historical and cultural-educational value entering the keep-up quadrant indicates that the attractiveness of the resource endowment itself has been recognized. The real shortcomings concentrate on D1 (spatial quality and supporting facilities), B3 (historical intelligibility), and G1/G2 (perceived cost-effectiveness), which jointly point to the same problem: the museum excels at "preserving and displaying" but is weak at "translating and organizing." Static objects and panels leave the interpretive work to visitors, and non-local visitors and adolescents without an industrial-history background can hardly construct meaning on their own. What constrains revitalization is not the depth of heritage value, but the capacity to transform it into a tangible experience. This echoes the existing judgment that museums emphasize display at the expense of interpretation.

4.2. The boundary of quadrants: Correcting IPA with the expectation gap

IPA takes both importance and performance into account, but because quadrants are bounded by sample means, they constitute a relative criterion and can easily mask absolute-level problems. Quality value is a case in point: its gap (0.300) is the largest and its performance (3.520) the lowest, yet because its importance (3.820) falls slightly below the overall mean it lands in the low-priority quadrant. If resources were allocated solely by quadrant, the most obvious deficiency would instead be deprioritized. E2 (professional and detailed docent guidance) scores only 3.588 on performance and also lies in the low-priority quadrant, but logically

it belongs with B3 under the rubric of "insufficient interpretation," so coordinated improvement would yield higher returns. Therefore, it is advisable to use the two-dimensional position to determine direction first, then refine priorities by the magnitude of the gap and the logical synergy among items: items with larger gaps should be prioritized for improvement, and mutually reinforcing items should be invested in a coordinated manner. This is not a rejection of IPA, but a return of its relative judgment to the absolute level for cross-checking.

4.3. The possible-overkill quadrant is not a downsizing quadrant

Social value falls into the possible-overkill quadrant, which under the conventional reading would call for compressed investment. However, social value carries the functions of interaction and memory generation when visitors travel in groups. The lower mean importance (3.782) more likely stems from visitors' low awareness of social benefits than from weak underlying demand. The typical industrial museum visit is a group activity: taking photos, retelling docent narratives, and sharing memories are themselves value-generation processes. This quadrant should therefore be "structurally rebalanced" rather than "wholly cut": incremental investment in repetitive exhibits should be curbed, and resources shifted toward low-cost social design—photo-worthy nodes, take-home memorabilia, and stories worth retelling.

5. Tourism enhancement paths

5.1. Narrative reconstruction: Turning object-based display into storytelling

In response to the insufficient historical intelligibility reflected by B3, four approaches are proposed. First, tiered interpretation: storytelling-style human guides and audio guides should be provided for individual visitors, organized around the threads of "one person, one machine, one migration"; study-tour groups should receive in-depth interpretation accompanied by task sheets; and an oral-history unit on CIS should be added for middle-aged and elderly visitors. Second, scenario-based linkage: a timeline and comparative exhibits should be built around three nodes—the wartime industrial relocation to the west, the Third-Front Construction and the reform-and-opening-up transformation—connecting exhibits through migration route maps, workers' diaries and then-and-now photographs. Third, docent capacity building should be established, with training and assessment mechanisms covering industrial history, history of technology and local history, translating "equipment parameters" into "human stories." Fourth, QR-code extensions, short animations, and interactive screens should complement the production processes that static panels cannot convey, responding to the demand of 45.9% of visitors for multimedia interaction.

5.2. Supporting-facility improvement: Rebuilding space for extended dwell time

D1 has the lowest performance score of all items and lies in the concentrate-here quadrant, making it the highest-priority area. It is recommended to review the density of rest nodes along the visitor route, add shaded, rain-proof seating and rest facilities in the middle of exhibition halls and in the open-air heritage park, provide drinking-water points, restroom signage and barrier-free access, introduce industrial-themed light dining and convenience retail, and improve lighting, ventilation and floor evenness while preserving the original workshop appearance. The criterion is not "whether it looks good" but "whether visitors can stay another half hour."

5.3. Value-for-money rebuilding: Responding to cost perception with experience density

The museum is free of charge, so the low perceived worth of monetary cost stems not from ticket prices but from the psychological accounting of "a special trip with limited returns." There are two enhancement paths. First, increase experience density per unit of time: scheduled guided tours, hourly demonstrations, and short workshops should fill fragmented visiting time so that a two-hour visit carries more content. Second, clarify the value proposition of paid programs: special exhibitions, study tours and cultural-creative products should be clearly priced with an explanation of "what makes it worthwhile," preempting a "not worth it" judgment. Time cost can also be eased through route optimization and time-slot reservation.

5.4. Consolidating advantages and reallocating resources

The keep-up quadrant should be "defended": uphold the authentic display of industrial relics, maintain the exhibition and interpretive labeling of the steel structure, cranes, railway tracks and steam prime mover, and avoid over-decoration that erodes industrial texture; nostalgic and reverent experiences should be deepened through old-photo walls, workers' personal effects, scene restoration and sound installations. Social value should be "amplified within convergence": repetitive decorative investment should be curbed and redirected toward low-cost social and memory design. The low-priority items D2, D3, E1, E2, and G3 should be gradually improved through routine inspection and service training, with E2 advanced in tandem with B3.

5.5. Industry-chain extension: From a single-point visit to a half-day itinerary

Short dwell time is the structural driver of low cost-value perception, and the experience chain can be extended in three ways. First, tiered study-tour products: basic study tours, in-depth study tours, and party-building and team-building courses should be developed for primary and secondary schools, universities, and enterprises, respectively, accompanied by task sheets and hands-on experiences, moving beyond the shallow "visit-plus-lecture" model. Second, cultural-creative IP development: products with high recognizability should be designed around unique symbols such as the steam prime mover, the CIS wartime relocation, and the century-long CIS history, responding to the demands of 49.8% of visitors, and secondary consumption should be encouraged through themed dining and handicraft experiences. Third, regional linkage: half-day and one-day routes should be developed connecting Yidu Ancient Town and the CIS cliffside walkway, seeking inclusion in the central-city museum loop, while official new-media channels should balance history popularization with industrial-aesthetics content.

6. Conclusion and limitations

Taking the Chongqing Industrial Museum as a case, this paper constructed a seven-dimensional, 24-item perceived-value system and conducted an IPA diagnosis, yielding three conclusions. First, the museum exhibits a pattern of "high expectation, low fulfillment": the mean importance score of all seven dimensions exceeds the mean performance score, with an average gap of 0.184, indicating that the revitalization supply has not yet fully met visitor expectations. Second, the value structure shows a pattern of "strong core experience, weak delivery, and supporting facilities": historical, cultural-educational, and emotional value form the keep-up quadrant, cost value falls in the concentrate-here quadrant, quality and service value lie in the low-priority quadrant, and social value resides in the possible-overkill quadrant; at the item level, the priority targets are historical intelligibility, spatial amenities, and perceived cost worth. Third, IPA quadrant

judgments need to be calibrated against the expectation gap and substantive dimension meaning: quality value sits in the low-priority quadrant yet records the largest gap, and social value sits in the possible-overkill quadrant yet carries a social-memory function; neither should be treated literally according to its quadrant label.

This study has several limitations. As a single-case study, generalizing its conclusions to other types of industrial-heritage sites must be done cautiously. The data are cross-sectional and cannot capture perceived changes after product iteration. The sample is dominated by local visitors, with a relatively small share of non-local visitors and special groups. The causal paths among dimensions, and between dimensions and behavioral intentions, were not tested. Future research may expand the scope of comparative cases and conduct longitudinal tracking.

Funding

This work was supported by the Graduate Innovation Program of Chongqing University of Science and Technology (Grant No. YKJCX2521016) titled "Research on Tourism Promotion Strategies of Chongqing Industrial Museum Based on Tourists' Perceived Value."

Disclosure statement

The author declares no conflict of interest.

References

[1] Edwards J, Llurdés JC, 1996, Mines and Quarries: Industrial Heritage Tourism. Annals of Tourism Research, 23(2): 341–363.

[2] Li LL, 2002, De-Industrialization and Industrial-Heritage Tourism Development: Practice and Development Model of the Ruhr Area in Germany. World Regional Studies, (3): 57–65.

[3] Lyu JC, 2021, Reflections on Tourism Development of Industrial Heritage in Central and Western China: A Case of the Third-Front Industrial Heritage. Guizhou Social Sciences, (4): 153–160.

[4] Zeithaml VA, 1988, Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence. Journal of Marketing, 52(3): 2–22.

[5] Sweeney JC, Soutar GN, 2001, Consumer Perceived Value: The Development of a Multiple Item Scale. Journal of Retailing, 77(2): 203–220.

[6] Huang YH, Huang FC, 2007, Tourist Perceived Value Model, Measurement and Empirical Study. Tourism Tribune, (8): 42–47.

[7] Zhang L, Xie ST, He JW, et al., 2018, Relationship Between Tourist Perceived Value and Satisfaction in Ancient Villages: A Case of Xiaozhou Village in Guangzhou. Tourism Forum, 11(3): 58–69.

[8] Zhang JB, Wu E, 2023, Research on the Recreational Function of National Parks Based on Tourist Perceived Value: A Case of Yellowstone National Park and Wuyishan National Park. World Regional Studies, 32(2): 146–157.

[9] Ren J, Gao XY, 2023, A Study on Tourist Perceived Value of Red Tourism in the Shaan-Gan-Ning Region. Ningxia Social Sciences, (2): 207–216.

[10] Long F, Zhu H, 2020, Research on Support for Homestay Tourism Development in the Yangtze River Delta Based on Tourist Perceived Value. Journal of Resources and Ecology, 11(6): 624–632.

[11] Yang WX, 2024, A Study on the Influence of Industrial-Heritage Tourist Perceived Value on Post-Visit Behavioral Intentions, thesis, Southwest University of Science and Technology.

[12] Martilla JA, James JC, 1977, Importance-Performance Analysis. Journal of Marketing, 41(1): 77–79.

[13] Huang ZH, Guan JW, Shi D, et al., 2023, Analysis of Ecotourism Tourist Value-Perception Factors Based on IPA: A Case of Jingyuetan National Forest Park in Changchun. Tourism Research, 15(2): 42–55.

[14] Shi CX, 2024, Research on Tourist Satisfaction of Tangshan Mine-Pit Park Based on IPA-KANO Analysis, thesis, Guangxi Minzu University.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.