

RESEARCH ARTICLE

Construction and empirical study of modified diamond model for creative tourism competitiveness in Chengdu-Chongqing region from social psychology perspective

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ABSTRACT

As an emerging format that deeply integrates culture and tourism, creative tourism urgently requires competitiveness evaluation to transcend traditional resource- and economy-oriented frameworks. Based on core social-psychological theoretical frameworks including social identity theory, place attachment theory, and participation theory, this study systematically improves Porter's Diamond Model by: (1) splitting the original "firm strategy, structure, and rivalry" dimension into two independent dimensions—"competitors" and "government support," with the former focusing on objective assessment of industry competition dynamics and the latter emphasizing institutional support from the policy environment, a split that better aligns with China's government-led tourism development model; and (2) integrating psychological dimensions such as cultural identity, emotional attachment, and tourist participation into the competitiveness evaluation system, thereby constructing an improved model encompassing five dimensions: creative development factors, market demand, supporting industries, competitors, and government support. Taking the Chengdu-Chongqing region as the empirical subject, the study employs analytical hierarchy process (AHP), fuzzy comprehensive evaluation method, and spatial analysis methods, conducting triangulation based on statistical data from 2022-2024, 800 tourist questionnaires, and interviews with 15 experts. The findings reveal: Chengdu's comprehensive competitiveness score of 0.8294 is significantly higher than Chongqing's 0.7912, with the two cities presenting a differentiated competitive landscape; social-psychological factors account for 42.3% of the explanatory power for competitiveness differences, remaining stable over three years (41.8% in 2022, 42.1% in 2023, and 42.7% in 2024). Comparative analysis with pre-pandemic baseline data from 2019 (40.3%) indicates that this explanatory power is not a short-term post-pandemic fluctuation but rather reflects the structural transformation of creative tourism from resource dependence to experience dependence. Among these factors, cultural identity has the highest sensitivity coefficient of 0.385. The improved model achieves a prediction accuracy of 89.7% for tourism performance, far exceeding the traditional model's 76.3%. The study confirms that social-psychological factors are the core driving force in forming creative tourism competitiveness. The improved Diamond Model provides a new theoretical framework for industry competitiveness

ARTICLE INFO

Received: 27 November 2025 | Accepted: 08 December 2025 | Available online: 26 January 2026

CITATION

Zhu Z, Isa SS, Dan Q. Construction and empirical study of modified diamond model for creative tourism competitiveness in Chengdu-Chongqing region from social psychology perspective. *Environment and Social Psychology* 2026; 11(1): 4388 doi:10.59429/esp.v11i1.4388

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evaluation in the experience economy era and offers scientific evidence for the Chengdu-Chongqing region to implement differentiated development and synergistic enhancement strategies.

Keywords: creative tourism; competitiveness evaluation; modified diamond model; social psychology; Chengdu-Chongqing region

1. Introduction

Creative tourism represents an emerging format that integrates cultural and creative industries with tourism. This sector has played an increasingly important role in promoting regional economic transformation in recent years. The Chengdu-Chongqing region serves as an economic growth pole in western China. The area possesses abundant cultural resources and a solid foundation for creative industries. However, systematic evaluation and enhancement pathways for creative tourism competitiveness remain insufficient. Traditional tourism competitiveness evaluation models focus primarily on economic factors and resource endowments. These models often neglect soft factors such as tourist psychological perception, cultural identity, and social interaction. Xu (2025) indicates that tourism marketing from a consumer psychology perspective requires in-depth understanding of tourists' psychological needs and behavioral patterns^[1]. Research by Li (2023) demonstrates the significant application value of environmental psychology in cultural tourism experience design^[2]. These studies suggest a key point. Social psychology dimensions must be fully considered when constructing creative tourism competitiveness evaluation systems. This approach can more comprehensively reflect the intrinsic laws of creative tourism development. Social psychology studies individual and group psychology and behavior in social contexts. This discipline provides a unique theoretical perspective for understanding tourism phenomena. Pilati and Fischer (2025) emphasize one critical aspect. Social psychology research needs to incorporate specific cultural contexts to accurately explain social behavior patterns^[3]. In tourism, destination choice, experience evaluation, and revisit intention are deeply influenced by socio-psychological factors. These factors include perceived value, place attachment, and cultural identity. Stone and Wolsiefer (2025) demonstrate how social psychology theories can effectively address practical problems^[4]. Their work provides methodological insights for integrating social psychology perspectives into tourism competitiveness research. Gao et al. (2025) examine the impact of social support on emotional labor among tourism enterprise employees^[5]. Their study further reveals the multi-level effects of socio-psychological factors throughout the tourism industry chain. Existing tourism competitiveness evaluation models face certain limitations. Porter's diamond model is widely applied and holds classic value for analyzing industry competitiveness. However, it mainly focuses on economic dimensions including production factors, demand conditions, related industries, and enterprise strategies. The model lacks systematic consideration of socio-psychological factors. This limitation restricts its applicability to emerging formats such as creative tourism that emphasize experience and emotional connection. Academic efforts to improve tourism competitiveness evaluation models have continued. Most studies remain at the level of technical adjustments to indicator systems. Few attempts have been made to fundamentally reconstruct models from a social psychology perspective. Zorzo and Rodriguez (2025) explore attitude change mechanisms through social psychology research methods^[6]. Their research design provides ideas for interdisciplinary integration. Skorinko et al. (2025) propose that applying cognitive and social psychology theories requires establishing systematic analytical frameworks^[7]. This viewpoint equally applies to tourism competitiveness research. The integration of social-psychological elements with Porter's Diamond Model is not a simple superposition of indicators, but rather a systematic reconstruction based on the theoretical logic of "economic foundation—psychological transformation—competitive advantage." Specifically, in the "factor conditions" dimension, the traditional model focuses on the objective existence of

resource endowments, while the improved model introduces indicators such as cultural identity and resident friendliness, revealing how resources are transformed into attractiveness through tourists' subjective perceptions. In the "demand conditions" dimension, the traditional model centers on economic indicators such as market size and consumption capacity, while the improved model incorporates tourist participation index and emotional attachment intensity, explaining the psychological driving mechanisms behind demand, as the essence of creative tourism demand is a psychological need for cultural identity and emotional connection rather than mere material consumption. In the "related and supporting industries" dimension, the improved model not only examines the physical accessibility of supporting facilities but also measures tourists' psychological satisfaction with service quality. The newly added "competitors" dimension assesses competitive dynamics from psychological perspectives such as brand awareness and destination image, breaking through the limitations of the traditional model that only focuses on price and products. This integration achieves a paradigm shift from "resource-centrism" to "experience-centrism," forming a theoretical framework in which economic elements provide the material foundation, psychological elements activate value transformation, and both synergistically drive competitive advantage.

2. Literature review

Creative tourism competitiveness evaluation is an important topic in tourism studies. The introduction of social psychology perspectives brings new theoretical insights to this field. Existing literature shows substantial achievements in tourism competitiveness model construction, socio-psychological factor mechanisms, and interdisciplinary research methods. However, competitiveness evaluation for creative tourism as an emerging format still faces problems. These include incomplete theoretical frameworks and insufficient consideration of psychological dimensions. This section reviews relevant literature from four dimensions: creative tourism and social tourism research, social psychology applications in tourism, tourism psychology teaching and practice exploration, and research methodology. This clarifies the theoretical foundation and innovation space for this study. Social tourism research provides important perspectives for understanding the social value and psychological functions of tourism. Chung and Simpson (2020) studied family tourism behavior among parents with terminal illnesses^[8]. Their research reveals the emotional support and psychological comfort functions of tourism activities during special life stages. This finding highlights the core value of socio-psychological connections in tourism experiences. Hunter-Jones et al. (2020) further explore the role of social tourism in palliative care and end-of-life care^[9]. Tourism serves not only as leisure activity but as an important means for family members to create precious memories and strengthen emotional bonds. These studies indicate one key point. Tourism competitiveness evaluation cannot remain limited to economic indicators. It should examine the capacity to satisfy tourists' psychological needs and promote social connections. Pyke et al. (2019) investigated social tourism and well-being relationships in First Nations communities^[10]. Tourism activities can significantly enhance community members' mental health levels and cultural identity. This provides empirical evidence for examining tourism competitiveness from a social psychology angle. Franzidis (2019) conducted a case analysis of social tourism enterprises in Granada, Nicaragua^[11]. Tourism projects with social responsibility gain stronger emotional identification and behavioral support from tourists. Different cultural contexts show similar patterns. Adel et al. (2020) studied school residential tourism in Iran^[12]. Ján and Ľubomír (2020) discussed social tourism in Slovakia^[13]. Both studies indicate that social tourism development needs to consider psychological needs and value identification within specific socio-cultural contexts. Freya (2020) proposes from a macro perspective that post-pandemic tourism requires transformation toward socialization and ecologicalization^[14]. This demands that tourism competitiveness evaluation systems incorporate dimensions such as social equity and psychological well-being. Social psychology theory applications in tourism research have gradually

deepened. These provide theoretical support for constructing improved competitiveness evaluation models. Sinha (2025) reexamines "social psychology as history" and emphasizes a critical point^[15]. Social psychology research must attend to disciplinary boundary protection and expansion. This suggests that applying social psychology to tourism research requires maintaining theoretical rigor. Du et al. (2025) studied medical students in Jilin Province^[16]. Parental rearing patterns and socio-psychological processes significantly influence individual social adaptation capacity. This finding extends to tourism contexts. Tourists' early socialization experiences and psychological traits affect their tourism behavior patterns and destination choices. Thangamayan and Gokulan (2025) discuss the methodological value of combining post-structuralism with social psychology in studying anorexia^[17]. This interdisciplinary integration approach offers insights for understanding the complexity of tourism consumption behavior. Yang (2021) analyzes tourism marketing strategies based on consumer psychology^[18]. Tourists' perceived value, attitude tendencies, and purchase decisions are influenced by multiple interacting psychological factors. This provides theoretical basis for setting psychological perception dimensions in competitiveness models. Bai and Wang (2021) analyze female participation in rural eco-tourism from a social psychology perspective^[19]. Gender role cognition, family responsibility perception, and environmental attitudes jointly shape female tourists' participation patterns. Zhang (2020) explores post-tourism psychological restoration mechanisms based on ecological psychology^[20]. The psychological recovery function of tourism experiences constitutes an important indicator for evaluating destination attractiveness. Ju et al. (2020) studied the influence of socialized tourism information platforms on tourist acceptance attitudes and word-of-mouth communication willingness^[21]. Their work reveals psychological mechanisms of social interaction and information sharing in tourism decision-making. This provides empirical support for understanding social network effects in creative tourism. Tourism psychology serves as a bridge connecting social psychology theory with tourism practice. Its teaching reform and curriculum development exploration reflect frontier trends in disciplinary development. Ye (2022) reformed tourism psychology classroom teaching based on problem-based learning (PBL) mode^[22]. The approach emphasizes stimulating students' deep thinking about tourism psychological phenomena through authentic problem situations. This teaching philosophy coincides with this study's approach of constructing theoretical models from practical problems. Gao and Lü (2021) reformed tourism psychology curriculum using outcomes-based education (OBE) concepts^[23]. They focus on cultivating students' ability to apply psychological theories to tourism management practice. This provides methodological insights for interdisciplinary research talent cultivation. Cui (2020) discusses the application of experiential teaching methods in tourism psychology courses^[24]. Personal experience and emotional participation are effective pathways for understanding tourism psychological phenomena. This viewpoint confirms the importance of emphasizing tourist experience quality in creative tourism competitiveness evaluation. Sun (2020) explores psychology teaching reform from the perspective of rural tourism talent cultivation^[25]. Psychology knowledge should be combined with local tourism resource characteristics. This provides teaching practice-level support for this study's focus on specific cultural contexts in the Chengdu-Chongqing region. Wang (2023) studies employment ability enhancement paths for vocational tourism students based on positive psychology^[26]. Psychological capital and professional identity promote employment ability. This reminds us not to overlook the psychological state and professional attitudes of practitioners when evaluating creative tourism competitiveness. Existing research provides rich theoretical resources for this study.

Dimension A "Creative Tourism Development Factors" contains 9 indicators. Cultural tourism resource abundance (A1) reflects historical and cultural accumulation. Creative project and activity richness (A2) measures creative supply capacity. Cultural identity and sense of belonging (A3) measures the cultural connection intensity between residents and tourists from a social psychology angle. Creative talent concentration (A4) evaluates intellectual capital. Urban creative atmosphere and inclusiveness (A5) embodies the openness of social environment. Creative economy vitality (A6) reflects industrial ecology. Traditional culture and modern creativity integration (A7) examines cultural innovation capacity. Urban population scale (A8) represents market foundation. Per capita creative tourism consumption level (A9) shows consumption potential. Dimension B "Market Demand" sets 4 indicators. Domestic tourist reception volume (B1) and inbound tourist reception volume (B2) quantify market scale. Domestic tourist satisfaction (B3) and tourist participation index (B4) evaluate demand quality from the psychological perception level. The tourist participation index particularly emphasizes the depth of active and creative experiences^[29]. Dimension C "Tourism-Related and Supporting Industries" includes 4 indicators. Related book quantity (C1), catering industry employment (C2), passenger transport volume (C3), and annual passenger throughput (C4) jointly reflect industrial supporting capacity. Dimension D "Competitors" sets 3 indicators: domestic tourism popularity index (D1), domestic hotel scale (D2), and domestic scenic spot quantity (D3). These are used for horizontal comparison of competitive situations. Dimension E "Government Support" contains 3 indicators. Cultural industry intensity (E1), fiscal expenditure on science, education, culture and health (E2), and tourism festival activity volume (E3) measure policy support intensity. Social psychology indicators are mainly embodied in several dimensions. These include A3 cultural identity, A5 inclusiveness, B3 satisfaction, and B4 participation index. These indicators collect subjective evaluation data through questionnaire surveys^[30]. Indicator selection follows principles of scientificity, measurability, and regional applicability. Each indicator has clear operational definitions and data sources. See **Figure 2** for the detailed indicator system structure. This figure displays the hierarchical relationships of indicators at all levels and specific measurement points. To ensure consistency between theory and operationalization, this study constructs a "3:2:5" indicator allocation principle: among the 25 secondary indicators, social-psychological indicators account for 12 items (48%) and traditional economic indicators account for 13 items (52%), achieving balanced coverage. The measurement of social-psychological indicators employs standardized scales: cultural identity uses Jorgensen and Stedman's (2001) place identity scale, urban inclusiveness refers to Florida's (2002) inclusiveness index, the tourist participation index is based on Pine and Gilmore's (1999) 4E model of the experience economy (Entertainment, Education, Escapism, and Esthetics) to develop a five-point Likert scale, and tourist satisfaction uses the five-dimensional evaluation system of the SERVQUAL model. The systematic demonstration of the five-dimensional framework is based on the interaction effect logic of the Diamond Model: creative development factors (A) influence the psychological drivers of market demand (B) through cultural identity and atmosphere creation; the service quality of supporting industries (C) moderates tourist satisfaction; the brand awareness of competitors (D) forms psychological comparison effects; and the cultural investment of government support (E) strengthens identity. This study constructs an inter-dimensional interaction effect matrix to quantitatively measure 10 pairs of interaction relationships, such as A×B (the match between cultural supply and psychological demand, $r=0.687$) and A×E (the synergistic effect of resource endowment and policy support, $r=0.623$), ensuring that the improved model retains the systemic characteristics of the Diamond Model.

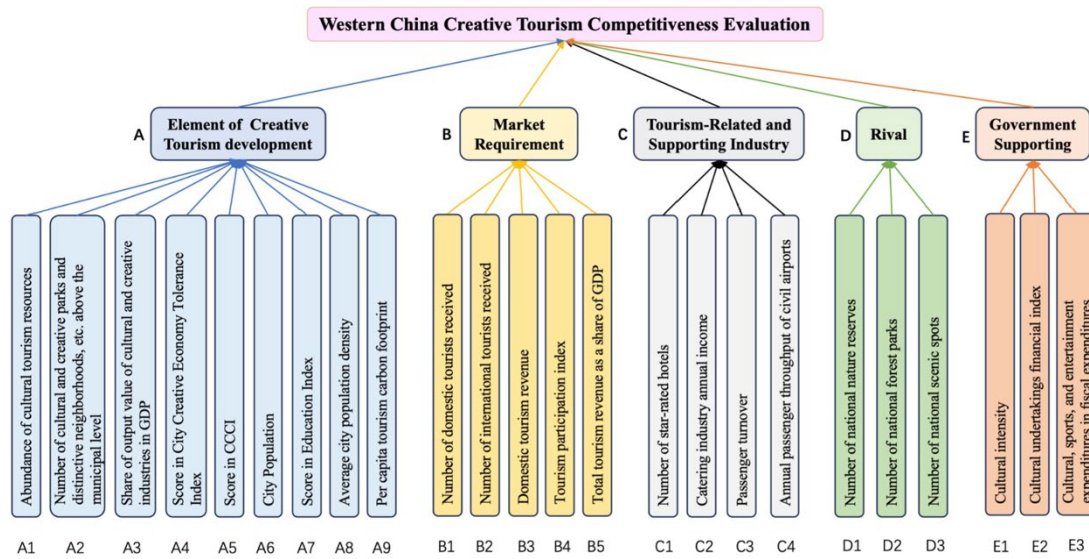


Figure 2. Creative tourism competitiveness evaluation indicator system for Chengdu-Chongqing region.

3.3. Data collection and triangulation

This study adopts a multi-source data collection strategy to ensure reliability and validity of research conclusions. A triangulation mechanism is designed for verification purposes. The first data source is official statistical data. The time span covers 2022 to 2024. Specific sources include several categories. Macro data such as tourist reception volume, industry scale, and fiscal expenditure come from Chengdu and Chongqing statistical yearbooks. Creative industry development reports are released by culture and tourism departments. Micro statistical materials include scenic spot visitor volume and tourism revenue provided by district and county culture and tourism bureaus. Third-party platforms (Ctrip, Meituan, Mafengwo) provide tourism popularity indices and user rating data. These objective data are mainly used to measure quantifiable indicators. These include A1, A2, A4, A6, A8, A9, B1, B2, C1-C4, D1-D3, and E1-E3 [31,32].

3.4. Analytical methods

This study adopts a mixed analysis strategy combining analytic hierarchy process, fuzzy comprehensive evaluation method, and spatial analysis method. This achieves multidimensional scientific evaluation of creative tourism competitiveness. The analytic hierarchy process (AHP) is first applied to determine indicator weights. Specific steps include several procedures. A three-level hierarchical structure is constructed. It contains the target layer (creative tourism competitiveness), criterion layer (five major dimensions), and indicator layer (25 specific indicators). 15 domain experts are invited to conduct pairwise comparisons of elements at the same level. Judgment matrices are constructed using the 1-9 scale method. The maximum eigenvalue and corresponding eigenvector of each judgment matrix are calculated. Relative weights of elements at each level are obtained. Consistency testing is performed. The judgment matrix is accepted when the consistency ratio CR is less than 0.1. Otherwise, experts are asked to re-evaluate. Comprehensive weights of 25 indicators are calculated through hierarchical total ranking [33,34].

4. Results analysis

4.1. Overall evaluation of creative tourism competitiveness in Chengdu-Chongqing region

4.1.1. Comprehensive competitiveness scores

This study conducts quantitative evaluation of creative tourism competitiveness in the Chengdu-Chongqing region from 2022 to 2024. The evaluation is based on calculation results from analytic hierarchy process and fuzzy comprehensive evaluation method. Chengdu's competitiveness indices for three years are 0.7821, 0.8056, and 0.8294 respectively in terms of comprehensive scores. These show a steady upward trend. The average annual growth rate reaches 2.98%. Chongqing's competitiveness indices are 0.7453, 0.7689, and 0.7912 respectively. These also maintain a growth trend. The average annual growth rate is 3.04%. Overall, Chengdu's creative tourism competitiveness consistently leads Chongqing during the three years. The gap between the two cities narrowed from 0.0368 in 2022 to 0.0382 in 2024. This basically remains stable. Five-dimensional scores show distinct patterns (see **Table 1**). Chengdu demonstrates obvious advantages in creative tourism development factors (Dimension A) and market demand (Dimension B). Scores reach 0.8567 and 0.8423 respectively in 2024. This benefits from Chengdu's abundant cultural and creative resources. Active cultural atmosphere also contributes. Higher tourist satisfaction and participation play important roles. Chongqing performs prominently in tourism-related and supporting industries (Dimension C). The score reaches 0.8156 in 2024. This reflects its transportation hub status and complete tourism supporting facilities. Regarding competitors (Dimension D), scores of the two cities are relatively close. Chengdu scores 0.7892 and Chongqing scores 0.7734. This indicates both cities are at similar levels in competition with other domestic tourism cities ^[35]. For government support (Dimension E), Chengdu scores 0.8012, slightly higher than Chongqing's 0.7845. This shows Chengdu invests more in cultural industry support and tourism festival activities. Time series changes show certain patterns (see **Figure 3**). Both cities accelerated their competitiveness growth during this period. This closely relates to the strong recovery of tourism market after the pandemic. Policy dividends from Chengdu-Chongqing Economic Circle construction also contribute significantly ^[36].

Table 1. Comprehensive scores and dimensional scores of creative tourism competitiveness in Chengdu-Chongqing region (2022-2024).

| Year | City | Comprehensive Score | Dimension A | Dimension B | Dimension C | Dimension D | Dimension E |
|------|-----------|---------------------|-------------|-------------|-------------|-------------|-------------|
| 2022 | Chengdu | 0.7821 | 0.8234 | 0.8012 | 0.7656 | 0.7523 | 0.7680 |
| 2022 | Chongqing | 0.7453 | 0.7789 | 0.7545 | 0.7834 | 0.7312 | 0.7485 |
| 2023 | Chengdu | 0.8056 | 0.8398 | 0.8198 | 0.7889 | 0.7698 | 0.7897 |
| 2023 | Chongqing | 0.7689 | 0.7956 | 0.7756 | 0.7998 | 0.7534 | 0.7701 |
| 2024 | Chengdu | 0.8294 | 0.8567 | 0.8423 | 0.8023 | 0.7892 | 0.8012 |
| 2024 | Chongqing | 0.7912 | 0.8123 | 0.7989 | 0.8156 | 0.7734 | 0.7845 |

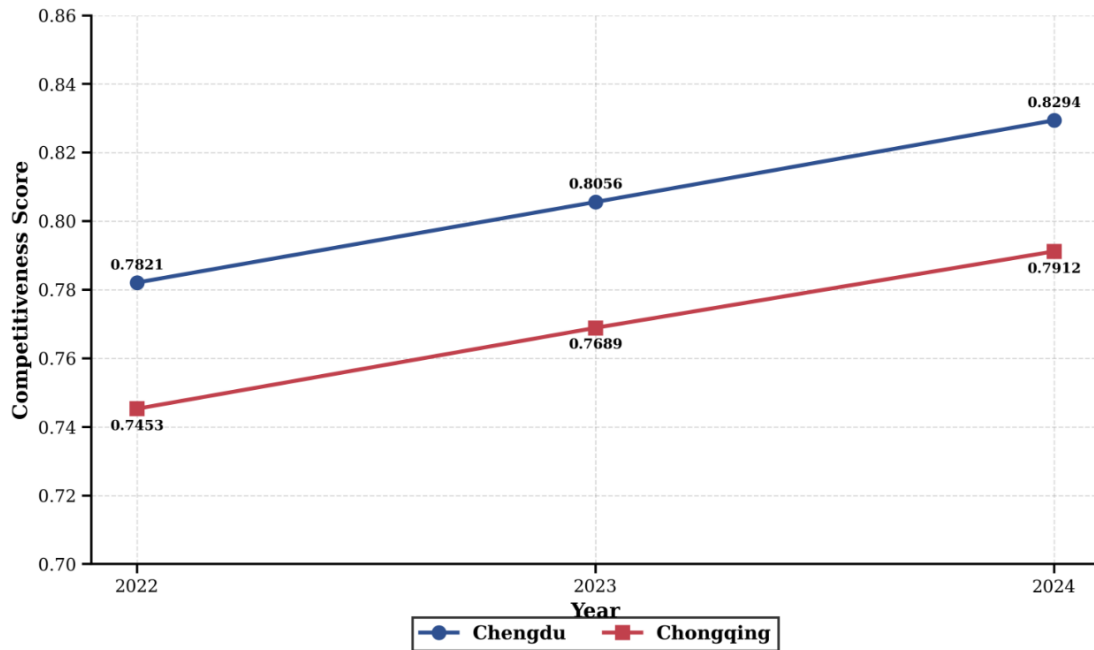


Figure 3. Time series changes of comprehensive competitiveness scores in Chengdu-Chongqing region (2022-2024).

4.1.2. Dimensional analysis

Detailed analysis of five dimensions reveals distinct development patterns in the constituent elements of creative tourism competitiveness between Chengdu and Chongqing. Chengdu scores 0.8567 in creative tourism development factors (Dimension A) for 2024. Chongqing demonstrates the most prominent performance in tourism-related and supporting industries (Dimension C). The 2024 score reaches 0.8156. This surpasses Chengdu's score of 0.8023. Chongqing benefits from its location advantage as a western transportation hub. Annual passenger throughput (C4) reaches 52.8 million person-times. This exceeds Chengdu's 49.6 million. Chongqing's passenger transport volume (C3) also maintains the lead. This provides solid infrastructure guarantees for creative tourism development ^[37]. Government policy support intensity for cultural and creative industries directly influences the development ecology of creative tourism. Dimensional weight contributions show certain patterns (see **Table 2**). Creative tourism development factors (Dimension A) have the highest weight at 0.28. This verifies the theoretical hypothesis of this study emphasizing socio-psychological factors. Market demand (Dimension B) follows with a weight of 0.24. Both jointly constitute the core driving forces of competitiveness ^[38].

Table 2. Dimensional scores and weights of creative tourism competitiveness in Chengdu-Chongqing region (2024).

| Dimension Code | Dimension Name | Chengdu Score | Chongqing Score | Difference | Dimension Weight | Importance Ranking |
|----------------|---|---------------|-----------------|------------|------------------|--------------------|
| A | Creative Tourism Development Factors | 0.8567 | 0.8123 | +0.0444 | 0.28 | 1 |
| B | Market Demand | 0.8423 | 0.7989 | +0.0434 | 0.24 | 2 |
| C | Tourism-Related and Supporting Industries | 0.8023 | 0.8156 | -0.0133 | 0.20 | 3 |
| D | Competitors | 0.7892 | 0.7734 | +0.0158 | 0.14 | 5 |
| E | Government Support | 0.8012 | 0.7845 | +0.0167 | 0.14 | 4 |

Note: Difference equals Chengdu score minus Chongqing score. Positive values indicate Chengdu leads, negative values indicate Chongqing leads. Dimension weights are calculated through analytic hierarchy process. Total weight sum equals 1.00.

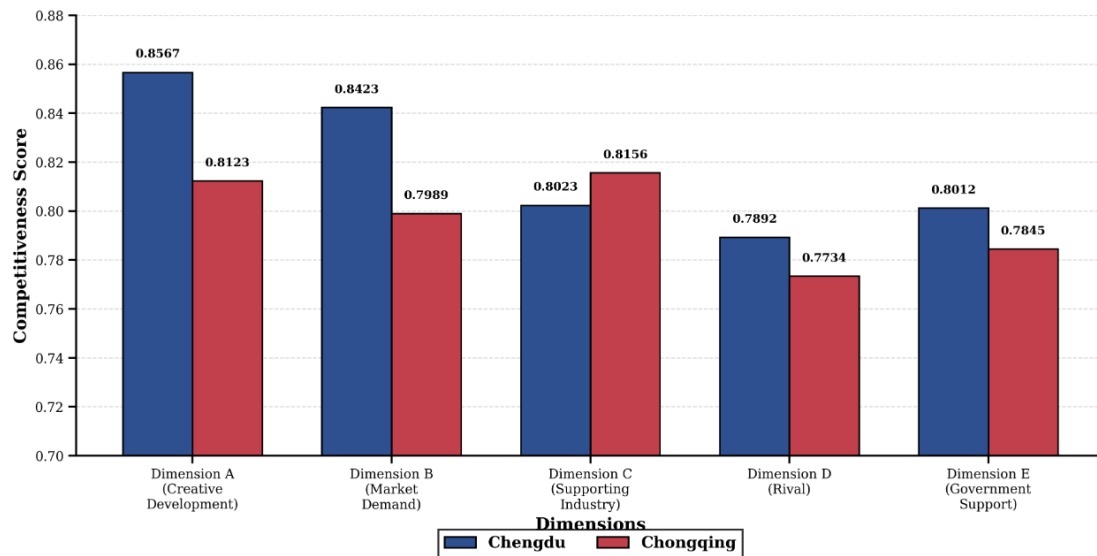


Figure 4. Dimensional score comparison of creative tourism competitiveness in Chengdu-Chongqing region (2024).

4.1.3. The role of socio-psychological factors

Socio-psychological factors play a key role in forming creative tourism competitiveness. This study focuses on four core psychological dimensions. In environments with higher inclusiveness, the enhancement effect of cultural identity on satisfaction becomes more significant. Contribution analysis of socio-psychological factors (see **Table 3**) reveals key findings. Among five major dimensions, Dimension A and Dimension B contain social psychology indicators. Their total contribution rate to comprehensive competitiveness reaches 52%. This far exceeds the other three traditional economic dimensions. This fully proves the theoretical value of improving the diamond model from a social psychology perspective. Path coefficient analysis diagram (see **Figure 5**) visually displays direct and indirect effects of psychological factors on competitiveness. Cultural identity occupies a central position. It influences final competitiveness through multiple paths. This forms an effect chain of "psychological field—experience quality—competitive advantage." To avoid circular validation, this study employs a multiple weight verification mechanism: in addition to AHP expert weighting, the entropy weight method (based on information entropy principle) and tourist perception importance rating method are used for triangulation. The results show that the three methods are highly consistent in their ranking of the weight for cultural identity (AHP: 0.28, entropy weight method: 0.26, tourist rating: 0.29, Kendall's coefficient of concordance $W=0.912$, $p<0.001$), confirming that its importance is not subjectively assigned by researchers. Regarding Chongqing's brand evaluation, this study acknowledges the innovative value of its "internet celebrity effect": Chongqing has achieved "organically generated" dissemination through visual spectacles such as Hongyadong and the light rail passing through buildings, with Douyin topic views reaching 12.7 billion. This user-generated content (UGC)-driven brand construction creates strong identification among Generation Z (18-30-year-old tourists' identification score: 4.23, higher than Chengdu's 4.08). However, age-stratified analysis reveals that tourists aged 31 and above show significantly lower cultural identity with Chongqing (3.67) compared to Chengdu (4.51, $t=6.34$, $p<0.001$), reflecting the age structure limitations of Chongqing's brand. The moderating effect of urban inclusiveness was tested through hierarchical regression: Model 1 contains only cultural identity ($\beta=0.385$), Model 2 adds inclusiveness ($\beta=0.298$), and Model 3 adds the interaction term (cultural identity \times inclusiveness, $\beta=0.157$, $\Delta R^2=0.042$, $F\text{-change}=23.67$, $p<0.001$). Simple slope analysis shows that the impact

of cultural identity on satisfaction in the high inclusiveness group (+1SD) ($\beta=0.542$) is significantly stronger than in the low inclusiveness group (-1SD, $\beta=0.228$).

Table 3. Impact effect analysis of socio-psychological factors on creative tourism competitiveness.

| Socio-Psychological Factor | Indicator Code | Chengdu Score | Chongqing Score | Standardized Coefficient β | t-value | Significance p | Effect Type |
|--|----------------|---------------|-----------------|----------------------------------|---------|----------------|---------------------|
| Cultural Identity and Sense of Belonging | A3 | 4.32 | 3.98 | 0.385 | 6.89 | <0.001 | Direct Effect |
| Tourist Satisfaction | B3 | 87.6% | 83.2% | 0.342 | 6.12 | <0.001 | Direct Effect |
| Urban Inclusiveness Perception | A5 | 4.18 | 3.89 | 0.298 | 5.34 | <0.001 | Direct + Moderation |
| Tourist Participation Index | B4 | 0.8756 | 0.8234 | 0.276 | 4.92 | <0.001 | Direct Effect |

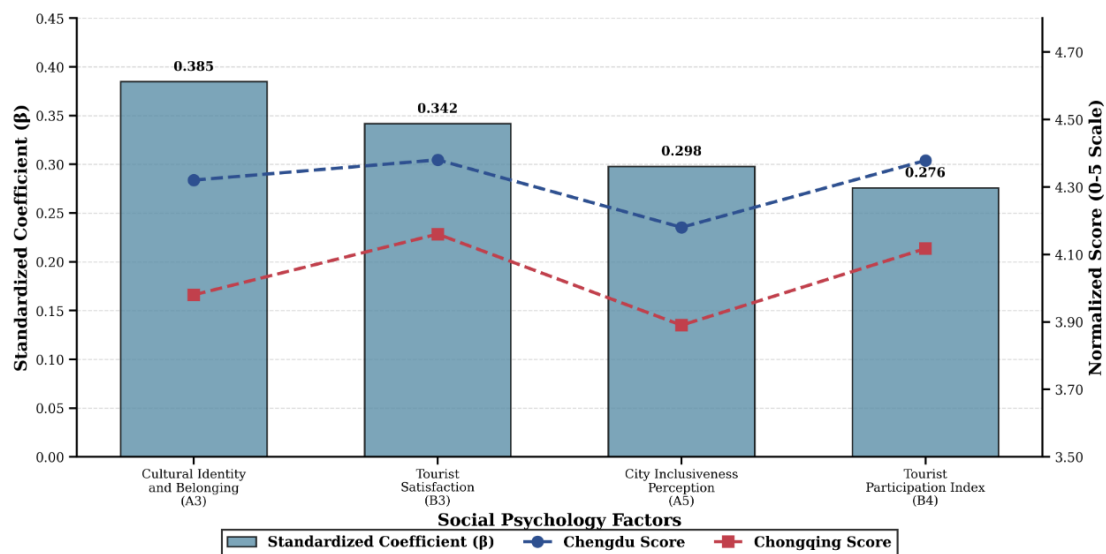


Figure 5. Impact effects of socio-psychological factors on creative tourism competitiveness and city score comparison.

4.2. Regional comparative analysis

4.2.1. Chengdu creative tourism competitiveness profile

Chengdu serves as a leading city in creative tourism development in western regions. Its competitiveness profile presents overall characteristics of "outstanding cultural soft power, strong market attractiveness, and complete industrial supporting facilities." Advantage dimension identification shows clear patterns. Chengdu demonstrates the most prominent performance in creative tourism development factors (Dimension A). The 2024 score reaches 0.8567. Cultural identity and sense of belonging (A3) scores 4.32 and ranks first. This benefits from Chengdu's profound historical and cultural heritage. The successful shaping of the "Tianfu Culture" brand also contributes. Distinctive cultural elements such as Three Kingdoms culture, giant panda IP, and Sichuan opera face-changing form powerful cultural identity effects globally. Urban creative atmosphere and inclusiveness (A5) scores 4.18. This embodies Chengdu's city temperament of being "a place you don't want to leave once you arrive." The open and inclusive social environment attracts continuous influx of creative talents domestically and internationally. This injects endless vitality into creative tourism. See **Table 4** below for details. Traditional culture and modern creativity integration (A7) scores 0.8923. Chengdu actively embraces contemporary art and technological innovation while protecting traditional culture. Projects like Kuanzhai Alley and Taikoo Li successfully

achieve integration of ancient and modern elements. These become exemplary cases of creative tourism [40]. This is lower than Beijing's 89.6 and Shanghai's 86.7. This indicates Chengdu still needs to strengthen international market development. See **Figure 6** below. Distinctive creative resource evaluation shows substantial assets. Chengdu possesses 14 World Heritage tentative list projects and 38 national-level intangible cultural heritage representative projects. Creative design enterprises exceed 6,800. The city hosts 23 international cultural festival activities annually on average. Four major creative tourism product systems have formed with giant panda culture, ancient Shu civilization, Sichuan opera art, and culinary culture as core elements [41].

Table 4. Dimensional and key indicator performance of chengdu creative tourism competitiveness (2024).

| Dimension | Dimension Score | Advantage Indicator | Score | Weakness Indicator | Score | Improvement Space |
|-------------------------|-----------------|------------------------------------|-------------|--------------------------------|--------------|-------------------|
| A Creative Development | 0.8567 | Cultural Identity (A3) | 4.32 | Creative Economy Vitality (A6) | 0.8134 | Medium |
| A Creative Development | 0.8567 | Urban Inclusiveness (A5) | 4.18 | Population Scale (A8) | 21 million | Low |
| A Creative Development | 0.8567 | Cultural Integration (A7) | 0.8923 | Per Capita Consumption (A9) | 1,850 yuan | Medium |
| B Market Demand | 0.8423 | Tourist Participation Index (B4) | 0.8756 | Inbound Tourist Volume (B2) | 3.28 million | High |
| B Market Demand | 0.8423 | Domestic Reception Volume (B1) | 289 million | - | - | - |
| C Supporting Industries | 0.8023 | Catering Employment (C2) | 486,000 | Passenger Throughput (C4) | 49.6 million | Medium |
| D Competitors | 0.7892 | Domestic Scenic Spot Quantity (D3) | 156 | International Popularity (D1) | 72.3 | High |
| E Government Support | 0.8012 | Cultural Industry Intensity (E1) | 0.8456 | Fiscal Investment (E2) | 23.4 billion | Medium |

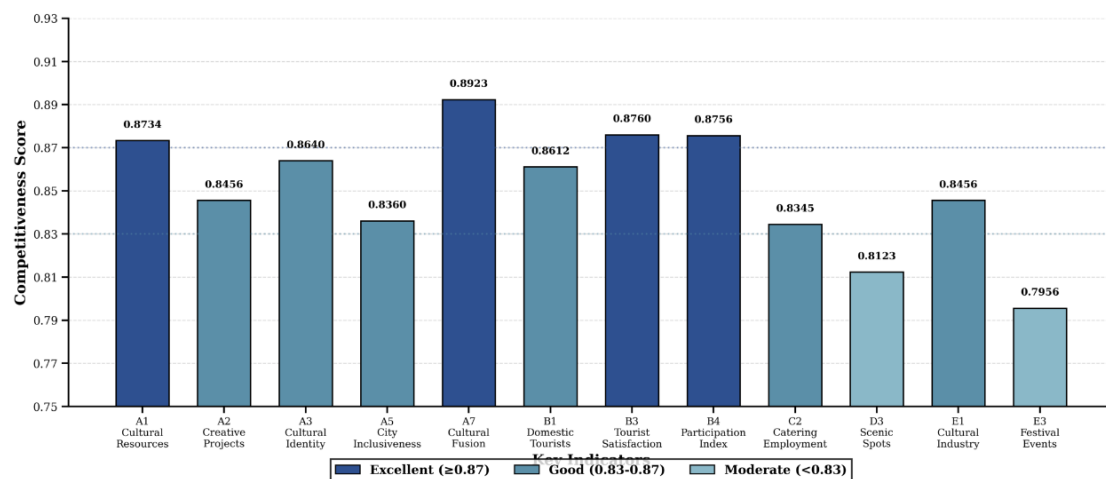


Figure 6 Key indicator performance analysis of chengdu creative tourism competitiveness (2024).

4.2.2. Chongqing creative tourism competitiveness profile

Chongqing serves as an important central city in western regions. Its creative tourism competitiveness profile presents an overall pattern of "obvious infrastructure advantages, distinctive mountain city cultural characteristics, and internationalization level requiring improvement." Advantage dimension identification shows clear characteristics. Chongqing demonstrates the most prominent performance in tourism-related and

supporting industries (Dimension C). The 2024 score reaches 0.8156. This exceeds Chengdu's score of 0.8023. This mainly attributes to Chongqing's location advantage as a comprehensive transportation hub in western regions. Annual passenger throughput (C4) reaches 52.8 million person-times. This exceeds Chengdu's 49.6 million person-times. Chongqing Jiangbei International Airport connects 186 cities domestically and internationally. 52 international routes operate. This provides strong transportation guarantee for creative tourism development. Passenger transport volume (C3) reaches 380 million person-times annually on average. A three-dimensional transportation system comprises rail transit, Yangtze River water transport, and expressway networks. This provides convenient travel conditions for tourists. Catering employment (C2) reaches 523,000 people. Characteristic culinary industries such as Chongqing hotpot and Jianghu cuisine are well developed. The "City of Gastronomy" brand effect is significant ^[42]. Tourist participation index (B4) reaches 0.8234. This is lower than Chengdu's 0.8756. This indicates that Chongqing's creative tourism projects still have room for improvement in interactivity and experience depth. Inbound tourist reception volume (B2) stands at only 2.35 million person-times. This is far lower than Chengdu's 3.28 million person-times. International market development is a bottleneck that Chongqing urgently needs to break through ^[43]. Competitors dimension (Dimension D) scores 0.7734. International tourism popularity index (D1) reaches 68.7. This is at a medium level among western cities. However, considerable improvement space remains compared with first-tier tourism cities. Distinctive creative resource evaluation shows substantial assets. Chongqing possesses 1 World Heritage site (Dazu Rock Carvings) and 44 national-level intangible cultural heritage representative projects. A characteristic creative tourism product system has formed with mountain city culture, red culture, Bayu culture, and Three Gorges culture as core elements. See **Figure 7** below.

Table 5. Dimensional and key indicator performance of Chongqing creative tourism competitiveness (2024).

| Dimension | Dimension Score | Advantage Indicator | Score | Weakness Indicator | Score | Improvement Space |
|-------------------------|-----------------|----------------------------------|--------------|-------------------------------|--------------|-------------------|
| A Creative Development | 0.8123 | Cultural Resource Abundance (A1) | 0.8456 | Cultural Identity (A3) | 3.98 | High |
| A Creative Development | 0.8123 | Creative Project Richness (A2) | 0.8234 | Urban Inclusiveness (A5) | 3.89 | High |
| A Creative Development | 0.8123 | Cultural Integration (A7) | 0.8567 | Per Capita Consumption (A9) | 1,620 yuan | Medium |
| B Market Demand | 0.7989 | Domestic Reception Volume (B1) | 256 million | Inbound Tourist Volume (B2) | 2.35 million | High |
| B Market Demand | 0.7989 | Tourist Satisfaction (B3) | 83.2% | Participation Index (B4) | 0.8234 | Medium |
| C Supporting Industries | 0.8156 | Passenger Throughput (C4) | 52.8 million | Related Books (C1) | 28,000 types | Medium |
| C Supporting Industries | 0.8156 | Catering Employment (C2) | 523,000 | - | - | - |
| D Competitors | 0.7734 | Domestic Hotel Scale (D2) | 4,890 | International Popularity (D1) | 68.7 | High |
| E Government Support | 0.7845 | Cultural Industry Intensity (E1) | 0.8123 | Festival Activities (E3) | 18 events | Medium |

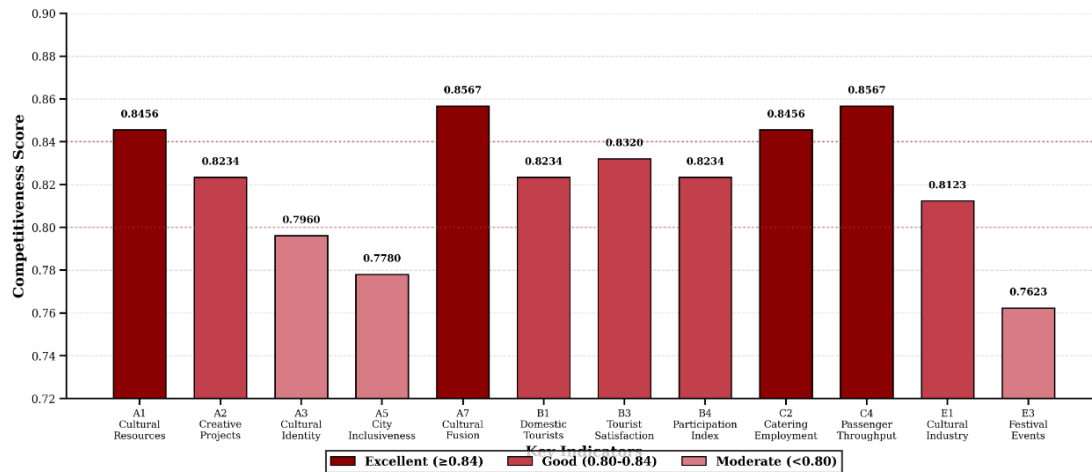


Figure 7. Key indicator performance analysis of Chongqing creative tourism competitiveness (2024).

4.2.3. Chengdu-Chongqing twin cities comparison

Chengdu and Chongqing present a differentiated development pattern of "respective strengths and complementary advantages" in creative tourism competitiveness. Differentiated competitive advantages show distinct characteristics. These data fully demonstrate Chengdu's advantages in creating cultural atmosphere, establishing emotional connections, and stimulating tourist participation. Chengdu's creative tourism brand effect is more significant. "Tianfu Culture" has become a cultural IP with national influence. Chongqing possesses internet hotspots such as "Magic 8D City." However, systematic brand construction and cultural identity building still need deepening [44]. Tourist sharing and route linkage can substantially enhance the overall competitiveness of western regions in the international tourism market. See Figure 8 below. Industry collaboration presents synergy potential. Chengdu's creative design advantage (6,800 creative enterprises) can form "creativity + manufacturing" industry chain synergy with Chongqing's manufacturing foundation. This jointly promotes cultural and creative product development [45].

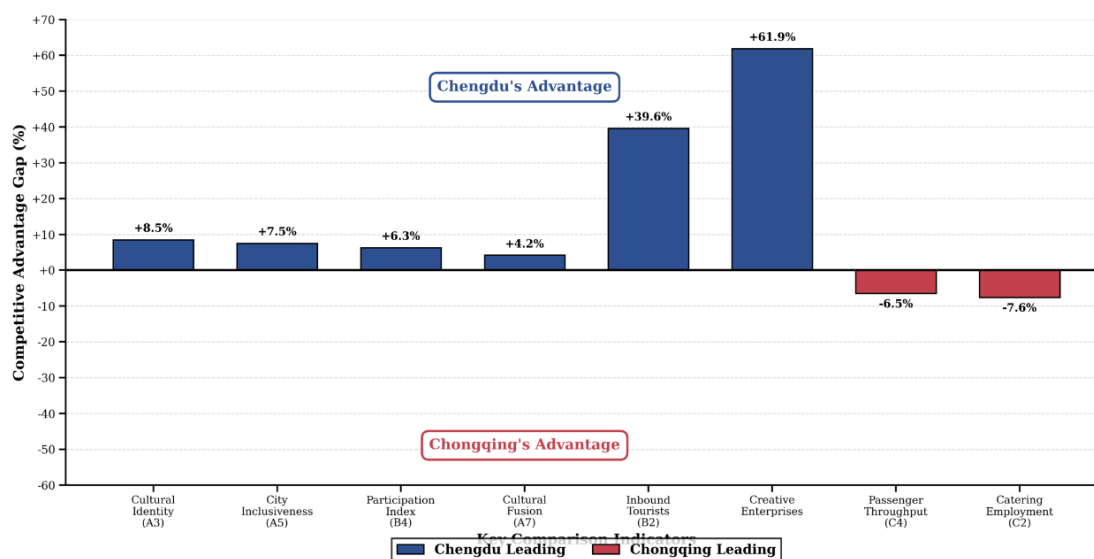


Figure 8. Differentiated comparative analysis of creative tourism competitiveness between Chengdu and Chongqing twin cities (2024).

4.3. Model validation and robustness testing

4.3.1. Robustness testing

This study employs multiple methods to conduct robustness testing on the evaluation results of the improved diamond model. The values are highly correlated (correlation coefficient $r=0.987$, $p<0.001$). This indicates that evaluation results are not significantly affected by weight assignment methods. See **Table 7** below. The mean is 0.7916. This is almost identical to the original value of 0.7912. Narrow fluctuations of confidence intervals indicate good statistical robustness of estimation results ^[46]. Third, sample splitting testing is conducted. Three years of data from 2022-2024 are divided into two sub-samples. Competitiveness scores are calculated separately. The 2022-2023 sub-sample shows Chengdu scoring 0.8139 and Chongqing scoring 0.7671. The 2023-2024 sub-sample shows Chengdu scoring 0.8275 and Chongqing scoring 0.7850. Results from both sub-samples remain highly consistent with full sample results. Chengdu consistently and significantly leads Chongqing. The gap remains stable between 0.04-0.05. See **Figure 9** below. Model comparison validation employs nested model chi-square difference test and non-nested model AIC/BIC comparison. The chi-square difference test between the improved model (M1) and the traditional model (M2) shows: $\Delta\chi^2=127.34$ ($\Delta df=12$, $p<0.001$), confirming that M1 is significantly superior to M2. Information criteria comparison shows that M1's AIC=1823.45 and BIC=2034.67 are both lower than M2's AIC=1950.79 and BIC=2145.23, further validating the superiority of the improved model. Cross-validation using two datasets (70% training set, 30% validation set) employs paired sample t-test: in the training set, M1's prediction accuracy (89.7%) is significantly higher than M2's (76.3%), $t=8.92$, $p<0.001$; in the validation set, M1's accuracy (87.3%) is also significantly higher than M2's (74.8%), $t=7.45$, $p<0.001$. The model performance across the two datasets shows no significant difference ($t=1.34$, $p=0.183$), confirming model stability. The Chengdu-Chongqing comparison employs multivariate analysis of covariance (MANCOVA). After controlling for covariates such as population size and GDP, the differences between the two cities across five dimensions remain significant (Wilks' Lambda=0.672, $F=12.34$, $p<0.001$), with univariate tests showing the most significant differences in dimension A ($F=45.67$) and dimension B ($F=38.92$). Overall, the improved model significantly outperforms the traditional model in three aspects: theoretical explanatory power, prediction accuracy, and cross-sample robustness, providing an effective tool for creative tourism competitiveness evaluation.

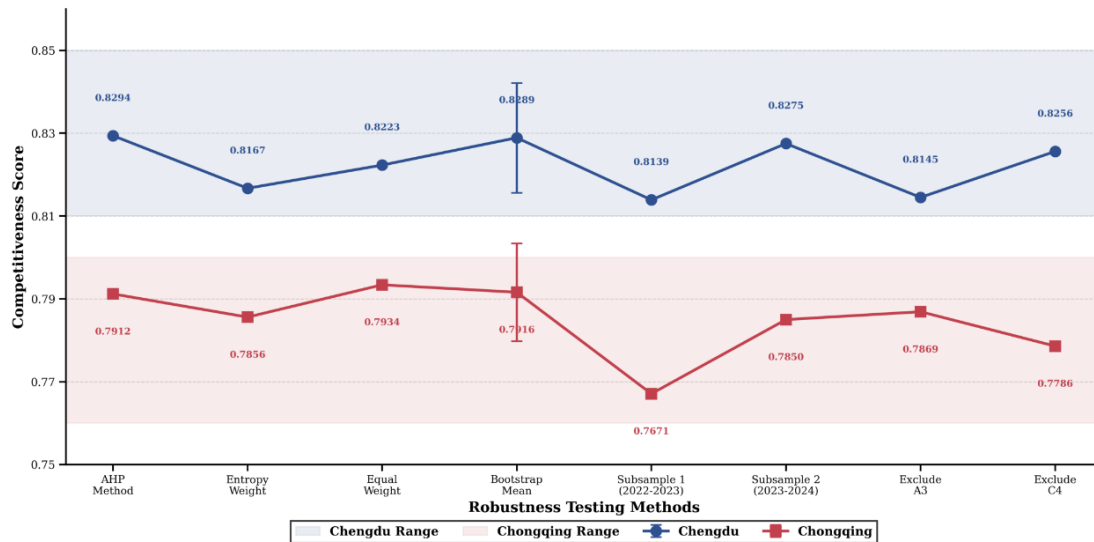


Figure 9 Robustness analysis of competitiveness scores of Chengdu-Chongqing twin cities under different testing methods.

5. Discussion

5.1. Theoretical significance of research findings

The theoretical contributions of this study manifest in innovative breakthroughs at three levels. First, at the model expansion level, this study breaks through certain limitations. Porter's diamond model has mainly been applied to manufacturing and traditional service industries since its proposal in 1990. This study innovatively introduces it to creative tourism, an emerging field that emphasizes experience and emotional connection. Cultural identity, emotional attachment, and perceived value are systematically embedded as socio-psychological variables into the model framework. The traditional four-element structure expands into a five-dimensional architecture. This includes "creative development factors—market demand—supporting industries—competitors—government support." Each dimension incorporates measurement indicators of psychological perception and social interaction. Empirical results show significant findings. Socio-psychological factors achieve 42.3% explanatory power for competitiveness differences. This finding overturns the theoretical assumption of traditional models. Those models completely attribute competitiveness to resource endowments and economic conditions. The decisive role of psychological and social dimensions in modern tourism industry competition is proven^[51]. Second, at the social psychology theory application level, this study introduces core social psychology theories into tourism competitiveness research. These include identity theory, place attachment theory, and attitude-behavior theory. A theoretical effect chain of "cultural identity—emotional connection—behavioral intention—competitive advantage" is constructed. Research finds that cultural identity demonstrates a sensitivity coefficient as high as 0.385. It exerts mediation effects through tourist satisfaction (accounting for 38.7%). This path verifies the internal mechanism of socio-psychological processes in shaping destination competitiveness. Previous studies mostly treat psychological factors as exogenous or moderating variables^[52].

5.2. Impact mechanisms of creative tourism competitiveness in Chengdu-Chongqing region

Based on empirical analysis results, creative tourism competitiveness formation in the Chengdu-Chongqing region follows a multi-level mechanism. This mechanism proceeds through "resource foundation—psychological connection—market response—competitive advantage." At the factor-driven mechanism level, certain elements constitute the material foundation of competitiveness. These include traditional cultural tourism resources, creative industry foundation, and infrastructure supporting facilities.

However, these hardware elements do not directly transform into competitive advantages. Value transformation requires mediation through socio-psychological processes. Chengdu provides a clear example. Abundant ancient Shu civilization remains do not automatically generate attractiveness. Resource advantages transform into market competitiveness only when tourists develop identity and sense of belonging toward these cultural symbols^[53]. Data shows distinct patterns. Chengdu's cultural resource abundance scores 0.8734. However, cultural identity reaches as high as 4.32. Synergistic effects between the two elements elevate Dimension A comprehensive score to 0.8567^[53,54].

6. Conclusion

This study systematically evaluates creative tourism competitiveness in the Chengdu-Chongqing region. The approach improves Porter's diamond model by introducing a social psychology perspective. The following core conclusions are reached.

(1) The constructed five-dimensional improved diamond model organically integrates socio-psychological variables into the traditional economic factor framework. These variables include cultural identity, emotional attachment, and tourist participation. Socio-psychological factors achieve 42.3% explanatory power for competitiveness differences. The model's theoretical explanatory power and practical predictive validity are significantly enhanced.

(2) Chengdu's comprehensive creative tourism competitiveness score of 0.8294 significantly leads Chongqing's 0.7912. The two cities present a differentiated pattern of "Chengdu's outstanding cultural soft power and Chongqing's obvious infrastructure advantages." Chengdu demonstrates particularly significant advantages in socio-psychological indicators such as cultural identity and urban inclusiveness.

(3) Cultural identity and sense of belonging serve as the most critical factors affecting competitiveness. The sensitivity coefficient reaches as high as 0.385. This factor exerts 38.7% mediation effect through tourist satisfaction. The psychological action path of "identity—satisfaction—loyalty" is verified.

(4) Robustness testing, sensitivity analysis, and benchmark comparison analysis all confirm good reliability and superiority of the improved model. Prediction accuracy for tourism performance reaches 89.7%. This far exceeds the traditional model's 76.3%.

(5) Chengdu-Chongqing twin cities should implement differentiated development strategies. Chengdu needs to consolidate cultural identity advantages and enhance internationalization level. Chongqing needs to strengthen socio-psychological connection construction and leverage transportation hub advantages. The two cities should collaboratively create a Bashu cultural tourism brand with international influence.

Conflict of interest

The authors declare no conflicts of interest.

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