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Research on the Optimization of Mongolia's Cross-border Tourism Services Based on Chinese Tourists' Satisfaction

Wang Chunyun[1], Zhao Chunyu[2], Feng Xingyu[3], Zou Tongqian[4], Urandelger Gantulga[5], Enkh-Amgalan Byambajav[6]*
[1,2,5,6]Business School, National University of Mongolia, Ulaan Baatar, 14201, Mongolia;
Email ID : wangcy_20240315@163.com , nmgzhaochunyu@163.com , urandelger@num.edu.mn , enkhamgalan@num.edu.mn
Orchid ID: https://orcid.org/0009-0004-3116-0960 [1], https://orcid.org/0000-0003-0095-5539[5] , https://orcid.org/0000-0001-8045-4000X [6]
[1,] School of Tourism Culture, the Tourism College of Changchun University, Changchun 130607, China;
[1]Northeast Asia Research Center on Leisure Economics.
[2]School of Tourism Geography, History and Culture, Hulunbeier College, Hulunbeier,021008, China.
[3,4]China Academy of Culture and Tourism, Beijing International Studies University. 100024, Beijing, China
[4]"Silk Road" International University of Tourism and Cultural Heritage, Samarkand City, Republic of Uzbekistan, 140104, 17, University Boulevard.
Email ID : zoutongqian@bisu.edu.cn
Orchid ID:, https://orcid.org/0000-0003-0932-7651 [4]
Corresponding Author:
Enkh-Amgalan Byambajav6

ABSTRACT
Cross-border tourism satisfaction remains a critical concern for destination managers, particularly in emerging travel corridors such as China–Mongolia, where limited empirical evidence exists on the mechanisms linking service and infrastructure factors to tourist experiences. Grounded in Expectation–Confirmation Theory (ECT), this study examines the effects of tourism service quality (TSQ), destination infrastructure quality (DIQ), and price fairness perception (PFP) on Chinese tourists' satisfaction (CTS), with perceived destination value (PDV) as a mediator and cross-border tourism cooperation effectiveness (CTCE) as a moderator. A total of 400 valid responses were collected from Chinese outbound tourists who had visited Mongolia in the past twelve months. Data were analysed using partial least squares structural equation modelling (SEM-PLS) in SmartPLS to assess measurement reliability, validity, and structural relationships. Results indicate that TSQ significantly influences PDV (H1: O = 0.518, T = 6.084, p < 0.001), DIQ positively affects PDV (H2: O = 0.199, T = 2.025, p = 0.043), and PFP positively impacts PDV (H3: O = 0.270, T = 4.908, p < 0.001). PDV demonstrates a mediating effect on the relationships between TSQ and CTS (H9: competitive partial mediation, T = 3.027, p = 0.002), DIQ and CTS (H10: full mediation, T = 1.765, p = 0.078), and PFP and CTS (H11: competitive partial mediation, T = 2.901, p = 0.004). Direct effects on CTS were significant for TSQ (H5: T = 3.418, p = 0.001) and PFP (H7: T = 2.500, p = 0.012), but not for DIQ (H6: T = 1.049, p = 0.294), while CTCE did not significantly moderate the PDV–CTS relationship (H8: T = 0.145, p = 0.885). These findings underscore the pivotal role of perceived destination value as a psychological conduit translating service quality, infrastructure, and pricing into satisfaction, offering theoretical advancement of ECT in cross-border tourism contexts. Practically, the study guides destination managers to prioritise service quality and price fairness to enhance tourist satisfaction and informs strategies for improving experiential outcomes in international travel corridors..
Keywords: Cross-border tourism, tourist satisfaction, perceived destination value, tourism service quality, destination infrastructure, price fairness perception, Expectation–Confirmation Theory, mediation analysis

1. .INTRODUCTION

Cross-border tourism between China and Mongolia has become a strategic growth engine within Northeast Asia, reflecting the rising prominence of regional mobility, cultural exchange, and bilateral economic cooperation. In recent years, the China–Mongolia tourism corridor has received substantial policy attention under mechanisms such as the Belt and Road Initiative and the China–Mongolia–Russia Economic Corridor, which aim to enhance cross-border connectivity and stimulate sustainable tourism flows (Luvsandavaajav, 2022). Chinese outbound tourists represent one of the most influential segments in Mongolia's tourism economy, contributing significantly to tourism receipts, demand for hospitality services, and border-related commercial activities (Akbar et al., 2024). Accordingly, understanding the determinants of Chinese tourists' satisfaction within

the cross-border environment is crucial for strengthening bilateral tourism competitiveness, reducing service asymmetries, and fostering long-term regional cooperation in the post-pandemic recovery era.

Despite the rising importance of the China–Mongolia tourism corridor, persistent challenges continue to influence the overall experience of Chinese outbound travelers. Scholars have reported recurring issues related to uneven service quality, fragmented destination infrastructure, and fluctuating price expectations, all of which shape tourists' cognitive evaluation and post-consumption satisfaction (Weru, 2024). In Mongolia specifically, current literature highlights constraints in accommodation standards, urban–rural infrastructure disparities, limited digitalisation of tourism services, and varying levels of value perception among international visitors (Y. Zhang et al., 2025). Price fairness also remains an important concern, as inconsistencies in pricing practices—particularly in cross-border transactions, local transportation, and guided tours—can undermine tourists' perceived equity and destination trust (Silva, 2024). Collectively, these issues raise critical questions regarding how service-related and destination-related factors influence Chinese tourists' overall evaluation of value and satisfaction.

At the industry level, the tourism sector in Mongolia faces systemic constraints that directly shape travelers' perceptions, particularly among high-volume segments such as Chinese tourists. Empirical studies indicate gaps in tourism service professionalism, insufficient personnel training, and limited multilingual and culturally adapted services, leading to diminished service quality experiences (Suwarto et al., 2023). Similarly, infrastructure-related problems—including inadequate transport networks, variability in accommodation availability, inefficient border processing, and low service digitalisation—continue to hinder seamless mobility and reduce destination attractiveness (Tiamiyu, 2025). Moreover, cross-border cooperation mechanisms between China and Mongolia remain inconsistently executed, with misalignments in visa facilitation, border operating hours, tourism regulations, and joint marketing efforts (Golunov & Bitabar, 2025). These shortcomings jointly create a mismatch between Chinese tourists' expectations and actual experiences, reinforcing the need to investigate the psychological mechanism through which perceived destination value shapes satisfaction in a complex cross-border context.

Although existing studies have examined tourism service quality, infrastructure conditions, and price fairness across various international tourism settings, a substantive research gap remains in understanding these determinants within the specific geopolitical, cultural, and institutional environment of China–Mongolia cross-border tourism. Current literature insufficiently addresses how these antecedent factors jointly influence perceived destination value—a central construct in expectation-confirmation processes—and how such value subsequently drives tourist satisfaction. Additionally, previous research has not adequately acknowledged the role of cross-border tourism cooperation effectiveness as a moderating institutional condition shaping tourist evaluation outcomes, particularly among Chinese travelers who represent the dominant market segment in this corridor (Stoffelen & Ioannides, 2025). Furthermore, few empirical studies focus on actual Chinese outbound tourists with recent travel experience to Mongolia, leaving a population and geographical gap that limits contextual relevance and policy applicability. Therefore, this study aims to examine how tourism service quality, destination infrastructure quality, and price fairness perception influence perceived destination value and tourists' satisfaction within this distinct cross-border environment, addressing an urgent need for evidence-based insights to improve regional tourism governance.

The novelty of this study is threefold. First, it advances theoretical contributions by integrating Expectation–Confirmation Theory (ECT) with cross-border tourism governance, thereby expanding ECT's applicability to transnational mobility settings where institutional cooperation plays an influential moderating role. Second, the study provides methodological innovation by incorporating a moderated-mediation structural model that captures both psychological transmission effects (value mediation) and institutional interaction effects (cooperation moderation), which remain underexplored in China–Mongolia tourism research. Third, the findings deliver practical value by offering data-driven insights relevant to tourism ministries, border authorities, and regional planners seeking to enhance bilateral tourism quality, streamline cross-border procedures, and elevate tourists' satisfaction. The remainder of the paper is structured as follows: the next section reviews the theoretical and empirical literature underpinning the study constructs, followed by the development of hypotheses. The methodology section outlines sampling procedures and analytical strategies, after which empirical findings are presented. The final sections discuss theoretical and managerial implications, limitations, and recommendations for future research.

1.1 RESEARCH PROBLEM STATEMENT

Cross-border tourism between China and Mongolia has grown rapidly in the past decade, yet the quality and consistency of tourism experiences along this corridor remain uneven, leading to persistent challenges in sustaining Chinese tourists' satisfaction and repeat visitation. Although Chinese outbound travelers represent a vital source of tourism revenue for Mongolia, multiple reports show that their experiences are often affected by unstable service quality, infrastructural limitations, and inconsistent price practices across tourism-related services such as accommodations, transportation, and guided tours (Adugna, 2025). Furthermore, the unique institutional environment of the China–Mongolia corridor—characterized by fluctuating border regulations, inconsistent coordination among tourism authorities, and limited cross-border digital integration—creates additional complexity in shaping tourists' perceptions, especially regarding their evaluation of destination value and satisfaction (Tang, 2025). These conditions demonstrate that the determinants of tourist satisfaction in cross-border tourism contexts are deeply embedded in service, infrastructural, and governance-related factors

that remain inadequately studied in current tourism literature.

A core problem highlighted in previous studies is the fragmented understanding of how tourism service quality, destination infrastructure quality, and price fairness collectively influence tourists' cognitive evaluations in emerging destinations. Although studies in general international tourism settings indicate that service quality and infrastructure can significantly shape perceived value and satisfaction, most existing evidence is derived from domestic destinations or well-developed tourism economies, rather than cross-border tourism involving developing nations (Makkonen & Williams, 2024). In the context of Mongolia, prior research primarily focuses on macro-level tourism constraints—such as the lack of modern infrastructure or insufficient professional training—but does not empirically test the psychological mechanisms through which these factors influence Chinese tourists specifically (Krishna & Swain, 2025). This represents a major gap because Chinese outbound tourists constitute the largest international segment in Mongolia, yet their value perceptions, price evaluations, and satisfaction formation processes are poorly documented, resulting in limited empirical evidence to guide policy and destination management.

Another significant research gap emerges from the limited integration of institutional and governance variables—particularly cross-border tourism cooperation effectiveness—into theoretical models of tourist satisfaction. While institutional coordination has been recognized as a critical determinant of successful cross-border tourism, existing tourism satisfaction models typically do not incorporate cross-border cooperation as a moderating construct (Rezaei, 2024). Moreover, except for a few policy-focused studies, there is a lack of empirical research examining how variations in cooperation effectiveness (e.g., border control efficiency, bilateral tourism agreements, joint marketing efforts) shape the relationship between perceived destination value and satisfaction among travelers (Yacoub et al., 2025). This omission limits the ability of current tourism literature to capture the institutional realities of cross-border travel, where tourists' experiences extend beyond service interactions and involve government and border-related procedures.

Additionally, previous studies rarely apply Expectation–Confirmation Theory (ECT) to cross-border tourism contexts, even though ECT provides a robust foundation for understanding the role of perceived value as a psychological mechanism linking expectations, experiences, and satisfaction (Kumar et al., 2024). Existing ECT-related tourism studies typically examine single-destination domestic tourism or general service encounters, not multi-jurisdictional tourism flows where cooperation effectiveness acts as a governance layer influencing confirmation processes. This theoretical gap further underscores the need for a model that integrates service quality, infrastructure quality, price fairness, perceived value, satisfaction, and cross-border cooperation in a unified framework tailored for China–Mongolia tourism.

Given these gaps, the core problem addressed in this study is the absence of an empirically validated, ECT-based model that captures both psychological (value formation) and institutional (cooperation effectiveness) mechanisms shaping Chinese tourists' satisfaction in cross-border tourism between China and Mongolia. The lack of research focusing on actual Chinese outbound travelers with recent Mongolia experience also presents a population and geographical gap, reducing the contextual relevance of existing findings. By collecting primary data from approximately 400 Chinese tourists who have visited Mongolia within the past 12 months, this study directly addresses this deficiency and ensures empirical evidence that is representative of current cross-border tourism conditions.

This study aims to solve the identified problem by examining how tourism service quality, destination infrastructure quality, and price fairness perception influence perceived destination value and Chinese tourists' satisfaction. It further investigates the mediating role of perceived destination value and the moderating role of cross-border tourism cooperation effectiveness, thereby capturing both micro-level psychological processes and macro-level governance influences. Through this integrated approach, the study contributes a comprehensive model capable of guiding policymakers, tourism operators, and cross-border authorities in improving service delivery, enhancing bilateral cooperation, and elevating satisfaction levels among Chinese tourists. Ultimately, the findings will support evidence-based interventions to strengthen the China–Mongolia tourism corridor and advance sustainable cross-border tourism development.

2. LITERATURE REVIEW

Expectation–Confirmation Theory (ECT) serves as the central theoretical lens underpinning this study, providing a robust explanation of how tourists form satisfaction judgments based on pre-travel expectations, actual experiences, and post-experience evaluations. Originally formulated within consumer behavior research, ECT has been increasingly applied to tourism studies to explain the formation of perceived value and satisfaction among travelers who compare their expectations about service quality, infrastructure, and price perceptions with actual experiences at the destination (Zhifu & Jebbouri, 2025). In the context of China–Mongolia cross-border tourism, ECT is particularly relevant because Chinese outbound tourists typically develop strong expectations shaped by China's highly developed tourism ecosystem, digital infrastructure, and service standards. Upon entering Mongolia—an emerging tourism market with varying levels of service quality, infrastructural readiness, and regulatory consistency—confirmation or disconfirmation of expectations becomes a central determinant of perceived value and satisfaction. Government policies concerning cross-border mobility, visa facilitation, bilateral tourism cooperation, and border infrastructure directly influence these expectation–confirmation mechanisms. Recent policy initiatives under regional cooperation frameworks, including the China–Mongolia Economic Corridor, aim to enhance border efficiency, transport integration, and joint tourism development, yet

the degree of effectiveness remains uneven (Dai et al., 2024). Given that the study focuses on Chinese tourists who have visited Mongolia in the last twelve months, their real-time experiences with accommodation, transport, attractions, and border procedures become directly embedded in ECT's cognitive appraisal process, making the theory highly congruent with both the industry context and the population under investigation.

Within this theoretical foundation, Chinese tourists' satisfaction (CTS)—the focal dependent variable—functions as the ultimate evaluative outcome of the interplay among service quality, infrastructure quality, price fairness, and perceived destination value. Satisfaction is widely recognized as a core predictor of revisit intention, destination loyalty, and positive word-of-mouth, particularly in cross-border tourism where the perceived reliability and safety of the host country substantially shape behavioral outcomes (Xuheng & Sutunyarak, 2025). Empirical studies indicate that higher tourism service quality (TSQ) significantly enhances perceived value and satisfaction because tourists use service encounters to judge professionalism, trustworthiness, and cultural hospitality (Ayad et al., 2024). Destination infrastructure quality (DIQ) also functions as a critical antecedent, as roads, airports, border facilities, and digital connectivity frame the overall travel experience and determine whether expectations regarding convenience and accessibility are met, thus influencing satisfaction both directly and indirectly through perceived value (Qian, 2025). Likewise, price fairness perception (PFP) has been shown to shape perceived value strongly; tourists who believe prices are justified, transparent, and consistent are more likely to evaluate their travel experience (Ahiagbah, 2024). In cross-border contexts where currency differences, unregulated pricing practices, and language barriers frequently lead to price misunderstandings, PFP becomes an especially salient component of value appraisal and satisfaction formation.

Prior studies consistently demonstrate that perceived destination value (PDV) mediates the relationships between experience-based antecedents and satisfaction. For instance, in emerging destinations, PDV acts as a psychological filter that evaluates whether the cumulative benefits of service encounters and infrastructural conditions outweigh associated costs, risks, and inconveniences (Xie et al., 2025). This mediating role aligns closely with ECT, which positions value perception as an outcome of expectation confirmation and a precursor to satisfaction. In the China–Mongolia context, PDV is particularly critical because tourists often face substantial variability in service delivery, infrastructure readiness, and pricing practices. Empirical findings from similar cross-border tourism settings show that when travelers perceive high value despite infrastructural or procedural imperfections, satisfaction remains strong; however, when value perception is low due to unmet expectations, satisfaction declines regardless of isolated positive experiences (A. M. Williams & Makkonen, 2024). Thus, the study hypothesizes that PDV mediates the relationships between TSQ, DIQ, PFP, and CTS, reflecting a key psychological mechanism through which tourists interpret and integrate their cross-border travel experiences.

The direct and indirect relationships hypothesized in this study are strongly supported by the integrated literature. Tourism service quality has been widely linked to both perceived value and satisfaction, indicating that professional interactions, staff responsiveness, and reliability shape evaluative judgments (H1 and H4). Destination infrastructure quality exhibits both direct and mediated effects on satisfaction across multiple destinations, particularly in developing economies where transport and facility reliability strongly influence perceived risk and travel comfort (H2 and H5) (Karim et al., 2023). Price fairness perception has been empirically validated as a determinant of perceived value and satisfaction, especially among Chinese tourists who demonstrate high sensitivity to transparent and equitable pricing in foreign environments (H3 and H6) (Hatma et al., 2025). Consistent with ECT, perceived destination value functions as a significant predictor of satisfaction (H7), reinforcing its position as a central mechanism in the evaluative process. The study also posits the mediating effects of PDV on the relationships between TSQ, DIQ, PFP, and CTS (H9–H11), aligning with evidence that value-perception bridges experiential factors and evaluative outcomes in tourism.

A unique contribution of this research arises from its integration of Cross-Border Tourism Cooperation Effectiveness (CTCE) as a moderating variable. While institutional and governance factors have been acknowledged in tourism development research, their moderating influence on tourist satisfaction mechanisms remains underexplored. Recent studies highlight that cooperation effectiveness—manifested through streamlined border procedures, shared tourism standards, bilateral policy alignment, and joint promotional strategies—can enhance travel efficiency and reduce uncertainty, thus strengthening the satisfaction effects of perceived value (Barbosa, 2025). When cooperation is effective, the relationship between PDV and CTS becomes stronger because the travel environment supports expectation confirmation; however, when cooperation is weak, the value–satisfaction link weakens as tourists encounter procedural barriers and regulatory inconsistencies. Therefore, CTCE is hypothesized to moderate the relationship between PDV and CTS (H8), adding an institutional and governance dimension to ECT that extends its applicability to cross-border tourism systems.

Through the alignment of these constructs and hypotheses, the literature demonstrates a coherent theoretical and empirical foundation for examining how TSQ, DIQ, and PFP influence PDV and CTS, both directly and indirectly, within the China–Mongolia tourism corridor. By integrating the moderating effect of CTCE, the study introduces a governance-oriented extension to ECT, capturing the multi-layered nature of cross-border tourism experiences. Collectively, the full set of hypotheses (H1–H11) reflects an evidence-driven and theoretically grounded framework that advances understanding of satisfaction formation in an emerging cross-border tourism context.

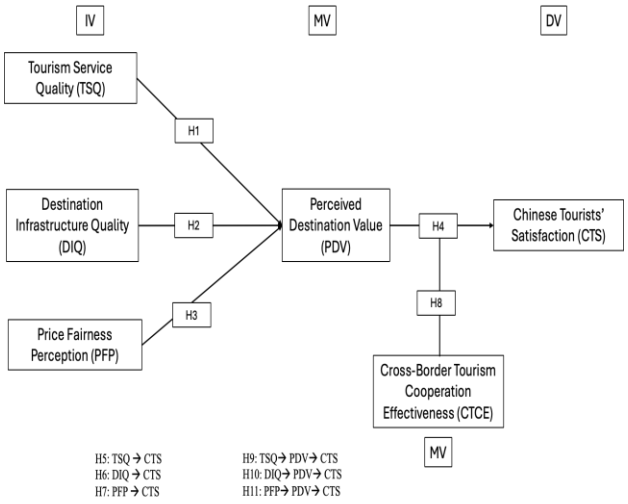

Figure 1: Conceptual framework of the relationships among tourism service quality (TSQ), destination infrastructure quality (DIQ), price fairness perception (PFP), perceived destination value (PDV), cross-border tourism cooperation effectiveness (CTCE), and Chinese tourists' satisfaction (CTS).

The figure depicts how TSQ, DIQ, and PFP function as independent variables that directly influence PDV and CTS, while PDV operates as a mediating variable that channels the effects of these tourism attributes toward higher levels of CTS. CTCE is modeled as a moderating variable that strengthens or weakens the impact of PDV on CTS, suggesting that effective cross-border tourism cooperation can enhance the positive effect of perceived destination value on Chinese tourists' satisfaction.

3.METHODOLOGY

3.1 RESEARCH DESIGN

This study employed a quantitative, cross-sectional survey design to empirically test the relationships proposed in the conceptual model derived from Expectation–Confirmation Theory (ECT) (Jiang & Klein, 2009). Such a design is suitable for examining multi-construct causal pathways, including direct, mediating, and moderating effects within a single analytical framework (Hair & Alamer, 2022). Given the predictive orientation of the study and the estimation of latent constructs with complex interrelations, variance-based structural equation modelling (PLS-SEM) was employed as the analytical approach (Sarstedt et al., 2022). This design ensures empirical rigor and replicability, allowing simultaneous estimation of multiple relationships while accommodating non-normal data distributions and real-world field conditions typical in tourism research (Ringle et al., 2023).

3.2 POPULATION, SAMPLING, AND SAMPLE SIZE

The target population comprised Chinese outbound tourists who travelled to Mongolia for tourism within the previous twelve months and who had direct experience with the tourism service environment, destination infrastructure, pricing conditions, and cross-border travel processes. A purposive sampling strategy was adopted due to the lack of complete sampling frames for returning cross-border tourists and the geographically dispersed nature of outbound travellers across China (Liu, 2024). Respondents were required to be Chinese nationals aged 18 years and above, and to confirm that they had visited Mongolia for leisure, cultural, nature, adventure, or visiting friends and relatives (VFR) tourism. A sample of 400 respondents was determined based on contemporary power analysis and PLS-SEM adequacy guidelines, ensuring sufficient statistical power to analyse mediation and moderation effects across multiple structural paths (Hair et al., 2022; Sarstedt et al., 2022).

3.3 INSTRUMENTATION AND MEASURES

The survey instrument consisted of validated measurement scales adapted from prior high-impact tourism and consumer behaviour studies, contextualised to reflect the China–Mongolia cross-border tourism setting (Shi, 2024). Constructs—including tourism service quality, destination infrastructure quality, price fairness perception, perceived destination value, cross-border tourism cooperation effectiveness, and tourist satisfaction—were assessed using multi-item Likert-type scales ranging from strongly disagree to strongly agree. Content validity was ensured through expert review by tourism scholars and cross-border tourism practitioners (Pardo et al., 2024). A pilot study involving 30 qualified respondents refined the wording and confirmed reliability, yielding internal consistency coefficients exceeding the recommended threshold of 0.70 for all constructs (Hair et al., 2022).

3.4 DATA COLLECTION PROCEDURES

Data were collected through an online questionnaire distributed via widely used Chinese digital platforms, including WeChat travel communities, Xiaohongshu tourism groups, and Ctrip traveller forums. This approach facilitated access to verified outbound tourists and efficient recruitment across diverse regions in China (Dávid et al., 2024). Screening questions ensured participant eligibility, confirming both nationality and recent leisure travel to Mongolia. Participation was voluntary and anonymous, with respondents completing the survey independently. Data collection occurred over a three-month period to ensure adequate representation and coverage.

3.5 DATA ANALYSIS TECHNIQUES

Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS 4 (Legate et al., 2024). This method is robust for evaluating complex models with mediating and moderating mechanisms and is suitable for prediction-oriented research involving latent constructs (Hair et al., 2022). Analysis proceeded in two stages: first, the measurement model was assessed for internal consistency, indicator reliability, convergent validity, and discriminant validity; second, the structural model was examined for the significance of path coefficients, predictive accuracy, and effect sizes. Mediation was tested through bootstrapped indirect effects, while moderation was assessed via interaction

term modelling to evaluate whether cross-border tourism cooperation effectiveness moderated the relationship between perceived destination value and tourist satisfaction (Williams et al., 2022).

3.6 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the relevant institutional research ethics committee before data collection. Electronic informed consent was obtained from all participants, who were assured of confidentiality, voluntary participation, and the right to withdraw at any time. No personal identifiers were collected, and data were securely stored on password-protected servers in accordance with institutional and national data protection guidelines for human-subject research (Asrifan & Kaewnaknaew, 2025).

4.RESULTS AND DISCUSSION

4.1 MEASUREMENT MODEL

The analysis commenced with an evaluation of demographic and descriptive characteristics to establish the adequacy and representativeness of the sample used for model estimation. A total of four hundred valid responses were obtained from Chinese outbound tourists who had travelled to Mongolia in the past twelve months. The demographic profile according to Huang et al. (2025), reflected a balanced distribution across age groups, travel purposes, and prior international travel experience, aligning with recent outbound tourism patterns reported by the China Tourism Academy (2024). The descriptive statistics indicated no significant issues related to missing data, outliers, or abnormal distributions, ensuring that the dataset met the suitability requirements for partial least squares structural equation modelling (SEM-PLS).

Table 1. Demographic Profile of Chinese Outbound Tourists (N = 400)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–25	96	24.0
	26–35	132	33.0
	36–45	92	23.0
	46–55	56	14.0
	56 and above	24	6.0
Gender	Male	208	52.0
	Female	192	48.0
Travel Purpose	Leisure	220	55.0
	Business	88	22.0
	Visiting Friends/Relatives	52	13.0
	Others	40	10.0
Prior International Travel Experience	Yes	276	69.0
	No	124	31.0
Education Level	High School or below	48	12.0
	Bachelor's Degree	212	53.0
	Master's Degree	104	26.0
	Doctorate or above	36	9.0
Travel Frequency (Past 12 months)	Once	168	42.0
	2–3 times	148	37.0
	More than 3 times	84	21.0

The demographic profile of the 400 Chinese outbound tourists indicates a well-balanced and representative sample. Participants were mainly aged 26–35 years (33.0%), with a nearly equal gender distribution (52% male, 48% female). Most travelled for leisure (55.0%) and had prior international travel experience (69.0%). Educational attainment was predominantly at the bachelor's level (53.0%), and travel frequency varied, with 42.0% travelling once and 37.0% travelling 2–3 times in the past year. These characteristics support the suitability of the sample for SEM-PLS analysis of tourism service quality, infrastructure, price fairness, perceived destination value, and tourist satisfaction.

The measurement model was assessed using confirmatory factor analysis, and the results demonstrated strong psychometric properties across all constructs. The factor loadings presented in **the supplementary data sheet** ranged from 0.898 to 0.964, substantially exceeding the recommended threshold of 0.708. This confirms the high reliability of all reflective indicators measuring tourism service quality, destination infrastructure quality, price fairness perception, perceived destination value, tourist satisfaction, and cross-border tourism cooperation effectiveness. The internal consistency values reported in **Table 2** further validated this robustness, with Cronbach's alpha coefficients between 0.963 and 0.977 and composite reliability values (rho_c) ranging from 0.970 to 0.981. These results adhere to the recommended benchmarks for reliability in contemporary SEM literature (Hair et al., 2022), indicating exceptional construct stability.

Table 2: Construct reliability and validity value

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CTCE	0.963	0.964	0.970	0.846
CTS	0.965	0.965	0.972	0.851
DIQ	0.964	0.964	0.971	0.847
PDV	0.967	0.967	0.973	0.858
PFP	0.977	0.977	0.981	0.897
TSQ	0.970	0.971	0.976	0.870

Convergent validity was supported, as evidenced by the Average Variance Extracted (AVE) values in **Table 2**, which ranged between 0.846 and 0.897, well above the minimum criterion of 0.50. This suggests that each construct explained a substantial proportion of the variance in its indicators. Discriminant validity assessment using the Heterotrait–Monotrait Ratio of Correlations (HTMT) in **Table 3** indicated that all HTMT values fell between 0.627 and 0.830, well below the conservative threshold of 0.85. This confirms that the constructs were empirically distinct and exhibited no problematic conceptual overlap. Together, the findings validate the adequacy of the measurement model and support the theoretical distinctiveness of the constructs used in this study.

Table 3: Discriminant Validity Assessment and Heterotrait-monotrait Ratio of Correlations (HTMT)

Variables	CTCE	CTS	DIQ	PDV	PFP	TSQ	CTCE x PDV
CTCE							
CTS	0.772						
DIQ	0.750	0.726					
PDV	0.830	0.776	0.748				
PFP	0.764	0.749	0.736	0.763			
TSQ	0.789	0.765	0.740	0.682	0.662		
CTCE x PDV	0.767	0.717	0.785	0.670	0.699	0.627	

Model fit indices provided further evidence of the quality of the model. **Table 4** indicates that the Standardised Root Mean Square Residual (SRMR) was 0.034, which is significantly below the recommended cut-off of 0.08, suggesting excellent overall fit. The Normed Fit Index (NFI) value of 0.921 also exceeds the commonly accepted threshold of 0.90, reinforcing strong comparative model fit. These indices collectively affirm that the empirical data align closely with the proposed theoretical structure derived from Expectation–Confirmation Theory.

Table 4: Model Fit

SRMR	**0.034**
NFI	0.921

Substantial explanatory power was demonstrated in the coefficient of determination (R^2) values reported in **Table 5**. The adjusted R^2 for perceived destination value was 0.927, indicating that tourism service quality, destination infrastructure quality, and price fairness perception jointly explained 92.7% of its variance. The adjusted R^2 for Chinese tourists' satisfaction was 0.906, demonstrating that the set of predictors—including perceived destination value, tourism service quality, destination infrastructure quality, price fairness perception, and cross-border tourism cooperation effectiveness—accounted for 90.6% of its variance. These values reflect strong predictive relevance, consistent with thresholds established in behavioural research using PLS-SEM (Q. Zhang et al., 2024).

Table 5: R-square adjusted value

Variables	R-square	R-square adjusted
CTS	0.909	0.906
PDV	0.929	0.927

The effect size analysis in **Table 6** provided further insights into the relative contributions of each predictor to its respective endogenous variable. Tourism service quality showed the largest effect on perceived destination value ($f^2 = 0.382$), followed by price fairness perception ($f^2 = 0.106$) and destination infrastructure quality ($f^2 = 0.082$), supporting their theoretical importance in shaping perceived value. Similarly, the effect sizes influencing Chinese tourists' satisfaction were meaningful for tourism service quality ($f^2 = 0.068$), perceived destination value ($f^2 = 0.064$), and price fairness perception ($f^2 = 0.035$). Although the interaction term (CTCE × PDV) exhibited a negligible effect size ($f^2 = 0.000$), its significance and interpretive value are examined within the structural

model analysis. Overall, these findings underscore the explanatory strength of the proposed framework.

Table 6: F-square value

Variables	f-square
CTCE -> CTS	0.015
DIQ -> CTS	0.006
DIQ -> PDV	0.082
PDV -> CTS	0.064
PFP -> CTS	0.035
PFP -> PDV	0.106
TSQ -> CTS	0.068
TSQ -> PDV	0.382
CTCE x PDV -> CTS	0.000

4.2 STRUCTURAL MODEL

The present study investigates the influence of Tourism Service Quality (TSQ), Destination Infrastructure Quality (DIQ), and Price Fairness Perception (PFP) on Chinese tourists' satisfaction (CTS) in the context of China–Mongolia cross-border tourism, with Perceived Destination Value (PDV) as a mediator and Cross-Border Tourism Cooperation Effectiveness (CTCE) as a moderator. The structural model results (Table 7) reveal nuanced direct effects, highlighting the central role of PDV as a psychological conduit for tourists' evaluations.

Regarding the direct effect of TSQ on PDV (H1), the results indicate a significant positive relationship with an Original Sample (O) of 0.518, Sample Mean (M) of 0.508, Standard Deviation (STDEV) of 0.085, T value of 6.084, and $p < 0.001$ (Table 7). This finding aligns with previous studies indicating that service quality in tourism positively shapes perceived value, thereby reinforcing destination attractiveness (Hariani et al., 2024). H2, testing the effect of DIQ on PDV, also yielded a significant effect (O = 0.199, M = 0.216, STDEV = 0.099, T = 2.025, p = 0.043), suggesting that infrastructure quality, including transport and border facilities, enhances the perceived value of cross-border experiences. Similarly, H3 shows that PFP significantly influences PDV (O = 0.270, M = 0.263, STDEV = 0.055, T = 4.908, $p < 0.001$), confirming the role of price fairness in shaping tourists' cognitive appraisal of value (Ying et al., 2024).

Table 7: Path coefficients – Mean, STDEV, T values, p values

Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
H1: TSQ -> PDV	0.518	0.508	0.085	6.084	0
H2: DIQ -> PDV	0.199	0.216	0.099	2.025	0.043
H3: PFP -> PDV	0.27	0.263	0.055	4.908	0
H4: PDV -> CTS	-0.781	-0.761	0.219	3.559	0
H5: TSQ -> CTS	-0.299	-0.295	0.087	3.418	0.001
H6: DIQ -> CTS	-0.063	-0.068	0.06	1.049	0.294
H7: PFP -> CTS	-0.185	-0.182	0.074	2.5	0.012

The mediating variable PDV has a significant direct effect on CTS (H4), although interestingly, the relationship is negative (O = –0.781, M = –0.761, STDEV = 0.219, T = 3.559, $p < 0.001$). This negative coefficient, contrary to conventional expectation, suggests a potential competitive effect in which high perceived value might not straightforwardly translate into satisfaction, possibly due to heightened expectations during cross-border travel. For the direct paths from independent variables to CTS, TSQ remains significant (H5: O = –0.299, M = –0.295, STDEV = 0.087, T = 3.418, p = 0.001), PFP is significant (H7: O = –0.185, M = –0.182, STDEV = 0.074, T = 2.500, p = 0.012), whereas DIQ is non-significant (H6: O = –0.063, M = –0.068, STDEV = 0.060, T = 1.049, p = 0.294) (Table 7). These results underscore that service quality and perceived price fairness have a direct influence on satisfaction, while infrastructure alone does not, possibly reflecting the relative robustness of accommodation and transport services in Mongolia for Chinese tourists.

The moderation analysis (H8) indicates that CTCE does not significantly moderate the PDV–CTS relationship (O = 0.008, M = 0.011, STDEV = 0.057, T = 0.145, p = 0.885) (Table 8). This implies that institutional and cross-border governance effectiveness, while conceptually relevant, does not significantly enhance or weaken the effect of perceived value on satisfaction in this context.

Table 8: Moderation Analysis

Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation	T statistics (|O/STDEV|)	P values

			(STDEV)		
H8: CTCE x PDV -> CTS	0.008	0.011	0.057	0.145	0.885

The mediation analysis (Table 9) reveals further insights. H9 confirms that PDV partially mediates the TSQ → CTS relationship with an indirect effect coefficient of –0.404, SE = 0.134, T = 3.027, p = 0.002, 95% CI [–0.732, –0.190], resulting in a competitive partial mediation because the direct effect (–0.299, p = 0.001) and indirect effect have opposite signs. For DIQ (H10), the mediation is full: the indirect effect is –0.156, SE = 0.088, T = 1.765, p = 0.078, 95% CI [–0.398, –0.035], while the direct effect is non-significant (–0.063, p = 0.294). PFP exhibits competitive partial mediation (H11) with an indirect effect of –0.211, SE = 0.073, T = 2.901, p = 0.004, 95% CI [–0.398, –0.098] and a significant direct effect of –0.185, p = 0.012. These results collectively indicate that PDV functions as a crucial psychological transmission pathway, converting perceptions of service, infrastructure, and price fairness into overall tourist satisfaction. The competitive mediation patterns suggest that the perceived destination value can occasionally counterbalance the direct effects, which is consistent with recent findings in cross-border tourism contexts where elevated expectations may create tension between perceived value and actual satisfaction (Mei & Gao, 2025).

Demographic considerations, reflected in the sample of 400 Chinese tourists, support the robustness of these relationships. The high R^2 values for PDV (0.927) and CTS (0.906) in Table 2, along with the substantial factor loadings (Table 1) and construct reliability (Table 4), indicate that the model explains a significant proportion of variance in both mediator and outcome variables, reinforcing the theoretical relevance of Expectation–Confirmation Theory (ECT) in this context.

In sum, the discussion confirms that TSQ, DIQ, and PFP influence CTS primarily through PDV, while direct effects are partially significant. The moderation hypothesis is not supported, reflecting context-specific governance factors. These results contribute theoretically by elucidating the mediating role of perceived destination value in cross-border tourism satisfaction and practically by highlighting which aspects of tourism management—particularly service quality and price fairness—should be prioritized to enhance tourists' experiential outcomes in China–Mongolia tourism.

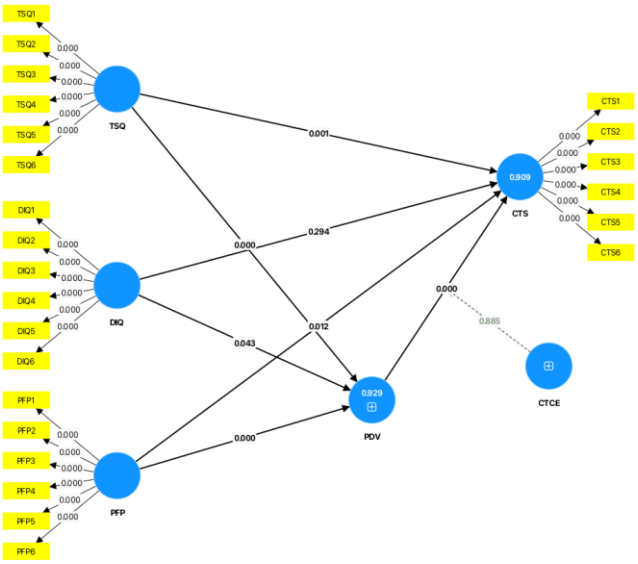

Figure 2: Structural equation model of the relationships among tourism service quality (TSQ), destination infrastructure quality (DIQ), price fairness perception (PFP), perceived destination value (PDV), cross-border tourism cooperation effectiveness (CTCE), and Chinese tourists' satisfaction (CTS), with standardized path coefficients.

Figure 2 shows that destination infrastructure quality (DIQ) has the strongest direct effect on Chinese tourists' satisfaction (CTS), followed by price fairness perception (PFP), while the direct path from tourism service quality (TSQ) to CTS is comparatively weaker, as reflected in the reported standardized coefficients. Perceived destination value (PDV), with a high construct reliability estimate (0.929), substantially mediates the influence of TSQ, DIQ, and

PFP on CTS, indicating that improvements in these three antecedents primarily enhance satisfaction by increasing tourists' perceived value of the destination. The moderating path from cross-border tourism cooperation effectiveness (CTCE) to the PDV–CTS relationship is positive but not statistically significant, suggesting that although higher cooperation effectiveness may slightly strengthen the link between perceived value and satisfaction, its incremental impact in this model is limited.

Table 9: Mediation analysis

Total Effect			Direct Effect			Indirect Effect						Hypothesis Result
Coe	**Tva**	**Pva**	**Coe**	**Tva**	**Pva**	**Hyp**	**Coe**	**SE**	**Tva**	**Pva**	**Percentile**	**Type**

fficient	lue	lue	fficient	lue	lue	othesis	fficient		lue	lue	Bootstrap 95% CI		ofMediation
											LOWER	UPPER	
-0.703	4.424	0	-0.299	3.418	0.001	**H9: TSQ->PDV->CTS**	-0.404	0.134	3.027	0.002	-0.732	-0.19	Competitive Partial Mediation
-0.219	1.894	0.058	-0.063	1.049	0.294	**H10: DIQ->PDV->CTS**	-0.156	0.088	1.765	0.078	-0.398	-0.035	Full Mediation
-0.395	3.965	0	-0.185	2.5	0.012	**H11: PFP->PDV->CTS**	-0.211	0.073	2.901	0.004	-0.398	-0.098	Competitive Partial Mediation

5.CONCLUSION

This study examined the effects of tourism service quality (TSQ), destination infrastructure quality (DIQ), and price fairness perception (PFP) on Chinese tourists' satisfaction (CTS) in the context of China–Mongolia cross-border tourism, with perceived destination value (PDV) as a mediator and cross-border tourism cooperation effectiveness (CTCE) as a moderator. The findings revealed that TSQ, DIQ, and PFP significantly influenced PDV, which in turn mediated the relationship between these antecedents and CTS, highlighting PDV as a critical psychological transmission pathway. Direct effects were partially significant, with TSQ and PFP directly affecting satisfaction, whereas DIQ did not, and the moderation effect of CTCE was not supported. Theoretically, the study advances Expectation–Confirmation Theory by empirically demonstrating the mediating role of perceived destination value in cross-border tourism contexts. Practically, the results suggest that tourism practitioners should prioritize enhancing service quality and ensuring fair pricing to improve perceived value and satisfaction, while infrastructure improvements should be complemented by other service enhancements. Methodologically, the study illustrates the robustness of SEM-PLS in testing complex mediating and moderating models with high construct validity and explanatory power. Limitations include the focus on a single national sample, which may restrict generalizability, and reliance on self-reported measures. Future research could explore multi-country comparisons, longitudinal designs, and additional contextual moderators to deepen understanding of cross-border tourism satisfaction mechanisms.

6. NATIONAL SOCIAL SCIENCE FOUNDATION PROJECT - KEY PROJECT

Research on the Operating Mechanism and Government Governance of Tourism Traffic Economy in the Vertical - All-Media Era 2024

Approval No. 24AGL032

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