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An Empirical Study on the Tourist Cognitive Evaluations of Tourism Public Services in Xinjiang Province, China

Yu Wu [1] and Yonghui Wang [1,2,*]

[1] College of Geographical Science and Tourism, Xinjiang Normal University, Urumqi 830054, China; wuyullxy@126.com
[2] Xinjiang Laboratory of Arid Zone Lake Environment and Resources, Xinjiang Normal University, Urumqi 830054, China
* Correspondence: wyhsd_3011@163.com; Tel./Fax: +86-991-4332295

Abstract: In the post-pandemic era, there has been a noticeable increase in tourism demand in China, and the comprehensive driving role of tourism in the national economy and social development has become more pronounced. Tourism public service providers, which are led by the government, urgently need to consider methods for enhancing the efficacy of public services in tourism to meet tourist demands, methods for further attracting more visitors, and methods for achieving sustainable and high-quality development in the tourism industry. However, despite the continuous enrichment and enhancement of the content and quality of tourism public services by Chinese government departments, the current research on government-provided tourism public services in underdeveloped areas is still relatively scarce in terms of tourists' cognitive evaluations. Therefore, this study focuses on five 5A-rated scenic areas in Xinjiang, where 1122 valid questionnaires were distributed. In using exploratory factor analysis and confirmatory factor analysis, we established an evaluation system for Xinjiang's tourism public services. Paired sample t-tests and importance–performance analyses (IPA) were employed to assess the importance and satisfaction of the aforementioned indicators. The results showed the following: (1) The tourism public service quality scale comprised 47 measurement items across four dimensions and exhibited high reliability, convergent validity, and discriminant validity. (2) The average satisfaction score across the 47 indicators was 3.90, thus indicating a favorable assessment of Xinjiang's tourism public services by visitors. In addition, the highest satisfaction noted was in well-established safety assurance mechanisms (4.46), and the lowest was recorded in facial recognition entry systems (3.35). (3) The IPA results suggest that aspects such as comprehensive traffic guidance signage, affordability of transportation, and convenience of access are factors that require maintenance. Clear safety guidelines and warning systems, truthful promotion, and emphasis on protecting tourist rights are in the potential advantage area. The promotion of paid leave policies requires moderate attention, while intelligent parking lots, electronic all-in-one cards for scenic areas, and one-click rescue indicators necessitate improvement. These research findings have significant practical implications for the construction of public services in Xinjiang's tourism.

Keywords: tourism public services; tourism performance; IPA analysis method; smart tourism

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1. Introduction

Public services in tourism play a supportive and protective role at every stage of tourist activity, and their quality is a crucial metric for evaluating service levels at tourist destinations [1]. The practice of evaluating satisfaction with tourism public services serves a dual purpose: it not only steers the sustainable development of tourist destinations but also pinpoints areas for improvement, thereby facilitating the refinement and innovation of regional tourism public services to foster an era of high-quality, sustainable growth in the tourism industry [2]. Recently, as the negative impact of the pandemic has waned, consumer demand for travel and consumption has increased rapidly, which has significantly led

to the rapid recovery of the tourism industry [3,4]. Additionally, the tourism industry in Xinjiang is witnessing a renaissance with the emergence of innovative tourism formats and technology-driven enhancements, thus marking a shift toward a new paradigm of market-driven and innovation-led growth. These evolving dynamics not only present developmental opportunities for the industry, but also usher in new requisites for tourism public services [5].

The tourism public service system is an essential support for the healthy development of the tourism industry, with the construction of public service systems in scenic areas being foundational for promoting comprehensive and sustainable tourism development [6]. The existing literature on tourism public services mainly focuses on public transportation, information, regulation, safety assurance, and public-benefiting services [7,8]. Certain scholars have also emphasized that tourism public infrastructure and the quality of market services should be included [9]. Additionally, special ecological tourism products like tea culture tourism, which combine resources and environment with tea tourism products, have also been incorporated into tourism public service evaluation indicators [10].

In recent years, through relying on unique natural and cultural tourism resources, the development of tourism in Xinjiang has been rapid. The number of tourists has continued to increase, and tourism demand has shifted toward diversification and personalization. Evaluation studies on tourism public services in Xinjiang have also been enriched, including studies on comprehensive tourism public services, specific tourism destinations, and festival tourism public service content [11,12]. The results of the studies indicate that the overall level of tourism public services has improved, but there are still persistent challenges in the areas of road transport, tourism public service facilities, and market regulation.

Despite the above findings, there is still a lack of studies on government-provided tourism public services, particularly in the detailed aspects of smart tourism services in western China. There is a need for a further division and integration of tourism public service dimensions to fill the research gap in evaluating key service areas such as smart tourism. In order to fill this gap, this paper aims to establish a government-led evaluation system for the tourism public services provided, as well as to evaluate such refinements when applied to Xinjiang's tourism smart tourism public services. This study integrates the existing evaluation index system of tourism public services to reveal the deficiencies of tourism public services in Xinjiang, with a view to continuously advance the comprehensive construction of tourism, provide new ideas for future academic research, and aid in the development of the practice of tourism public services in Xinjiang or other regions of China (thus promoting the sustainable development of tourism). Three aspects were identified as the objectives of this study: (1) To explore the content of tourism public services in Xinjiang under the government's leadership, to increase the number of refined project index items such as smart tourism, and to establish and validate the evaluation index system of tourism public services in Xinjiang. (2) To investigate the overall level of tourism public services in Xinjiang from the perspective of tourist perception, and to judge whether they can meet tourist needs. (3) To evaluate tourists' perceived importance and satisfaction ratings of government-supplied tourism public services, as well as to analyze and study the areas (based on the performance of tourism public service indicators) that should be focused on in the construction of tourism public services in the future.

2. Literature Review

The World Tourism Organization defines "tourism services" as "all services provided by institutions or enterprises in the tourism industry to meet tourists' needs" [13]. Scholars consider tourism services as a business activity realized through managing various forms of facilities, equipment, methods, means, channels, and service personnel [14]. Differing from tourism services, public services are non-profit services provided to most citizens. Due to significant market failures, the government is justified in engaging in production, financing, or regulatory activities [15]. As one of the components of public service

provision, tourism public services are a system formed based on government functions to meet tourist needs [16]. Among the many definitions of tourism public services, the government-led supply characteristic has been repeatedly mentioned by scholars [17,18] as it helps to target the organizations and individuals involved in tourism activities, as well as aids in understanding how to satisfy group demands for non-profit products and services [19]. In addition, it is characterized by being fundamental, public welfare-oriented, and platform-based [20]. The academic community offers diverse definitions of tourism public services; however, although it is based on previous research, this paper believes that tourism public services are primarily fundamental and public welfare services that are led by the government and provided jointly with other social organizations are aimed at satisfying the core travel needs of tourists.

Public transportation services in tourism require continuous adjustment and optimization of routes, as well as the strengthening of feeder network construction [21], along with the rational layout of traffic signs, parking facilities, and tourist distribution centers [22]. Tourism information services are closely linked to transportation, thereby ensuring reliable and timely information services, as well as aiding in expanding the scope of existing consultation services [23]. Under the context of comprehensive tourism, the operational mechanisms of the tourism industry, its elemental content, and the spatial–temporal dynamics of industry activities have undergone significant changes, which has led to new scenarios and challenges for security measures [24]. Government departments need to innovate tourism regulatory models. They need to establish and perfect a comprehensive governance system and mechanism involving multiple departments [25], thereby providing tourism safety assurance services that offer broad and even borderless security guarantees for tourists. Certain scholars have used grounded theory to progressively encode tourist reviews [26], thereby deriving evaluation indicators such as property and personal safety services, food safety, and pricing [27].

Recently, tourism convenience services have gained increased attention as they have aimed to maximize the shared functionality of public services, whereby a tourism public service system is constructed that aligns with comprehensive tourism. Such an approach not only drives local economic development but also works to enhance the utility and value of public services in terms of benefiting and facilitating the public [28]. In border and ethnic areas, activities such as ticket discounts or giveaways can be gradually implemented according to local conditions, thus enhancing the public-benefiting nature of tourism services [29]. In providing services that benefit the public, initiatives like advancing the "toilet revolution" and strengthening waste management are crucial to maintaining the sustainability of tourist attractions [30].

As the development of smart tourism services deepens, technology not only enriches and expands the content of public services in tourism but also enhances their quality. The feasibility of constructing a sustainable smart city tourism environment can be analyzed from perspectives such as experiential value, tourist participation, satisfaction, and consumption intention, as well as especially in evaluating post-pandemic satisfaction with smart tourism transportation [31]. Scholars have evaluated the service quality of fundamental tourism public services integrated with smart tourism for specific types, such as tourism information public services; in addition, they have also developed evaluation systems covering online information services, consultation services, signage interpretation, and information promotion services [32]. Other researchers have constructed theoretical and research models on the impact of public tourism information services on destination quality [33,34], and they concluded that smart public tourism information services significantly correlate positively with tourist behavior and psychological responses. Thus, the construction of smart tourism is beneficial for shaping the image of tourism destinations [35], thereby enhancing tourist interactivity and participation, as well as leading to satisfactory tourism experiences [36]. The widespread application of digital technology is conducive to strengthening the digitalization of government governance and promoting

the regulation of online travel platforms (OTAs) [37]. In summary, existing research has established a relatively complete evaluation system for tourism public services (Figure 1).

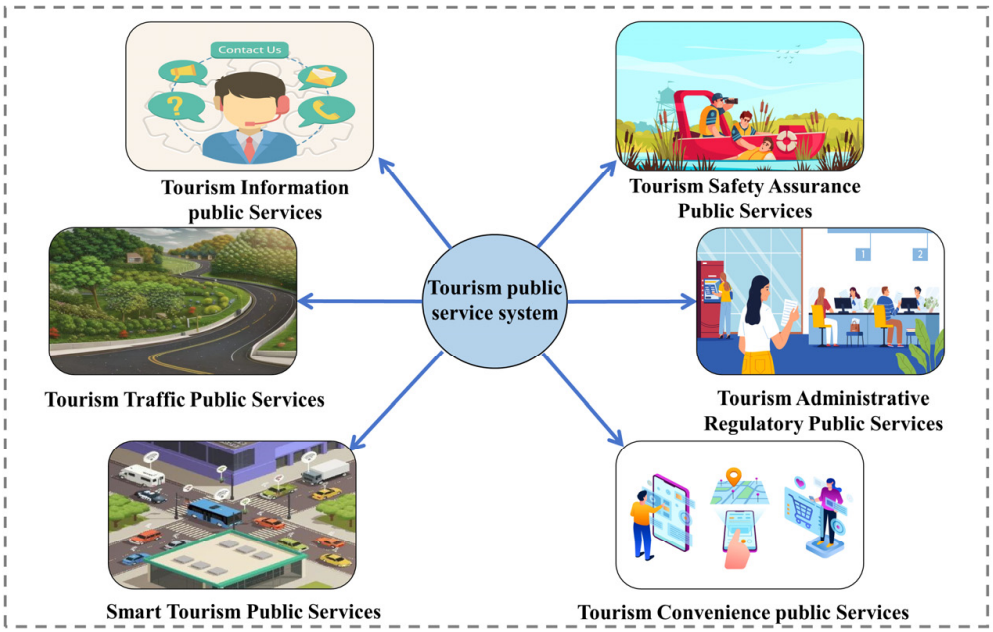


Figure 1. Tourism public service construction.

3. Research Design

3.1. Case Selection and Data Collection

Located in the northwest of China, Xinjiang is home to 2 world cultural heritage sites, 3 world intangible cultural heritage items, 1 world natural heritage site, and 17 national 5A-level scenic areas. In the first three quarters of this year, Xinjiang welcomed a staggering 213.87 million visitors, marking a year-on-year increase of 77.73%. The tourism revenue reached an impressive CNY 233.76 billion, which is up by 160.13% from the previous year [38]. Since June 2023, with a significant influx of tourists into Xinjiang, challenges have emerged in numerous scenic areas, including delays in publishing real-time visitor data, which has led to extended waiting times. Additionally, certain areas have witnessed a rise in tourism expenses and traffic congestion, thus making the quality of tourism public services a central concern for prospective visitors. Therefore, evaluating the effectiveness of the tourist satisfaction index system for tourism public services in Xinjiang is of paramount practical significance.

For this paper, surveys were conducted in five 5A-rated scenic areas across Xinjiang, including the Nalati Grassland in Yili Kazakh Autonomous Prefecture's Xinyuan County, Sayram Lake in the Bortala Mongolian Autonomous Prefecture, Kashgar Old City, Grape Valley in Turpan, and the Tianshan Grand Canyon. These scenic areas are situated in Xinjiang's west, south, east, and north regions, and collectively, they represent a diverse range of tourism resources, thus making them highly representative of the region (Figure 2). The survey, conducted from 20 June to 5 September 2023, involved distributing both paper and electronic questionnaires (on-site code scanning) to tourists within these areas, and these were coupled with random on-site interviews. The average response time of the questionnaire was around 240 s, though this was influenced by the personal situation of the respondents. Out of the 1400 questionnaires distributed, 1164 were returned, yielding a response rate of 83.14%. Of these, 1122 were deemed valid, whereby it was concluded that there were 1096 valid paper questionnaires and 26 valid e-questionnaires, thus resulting in a 95.05% validity rate.

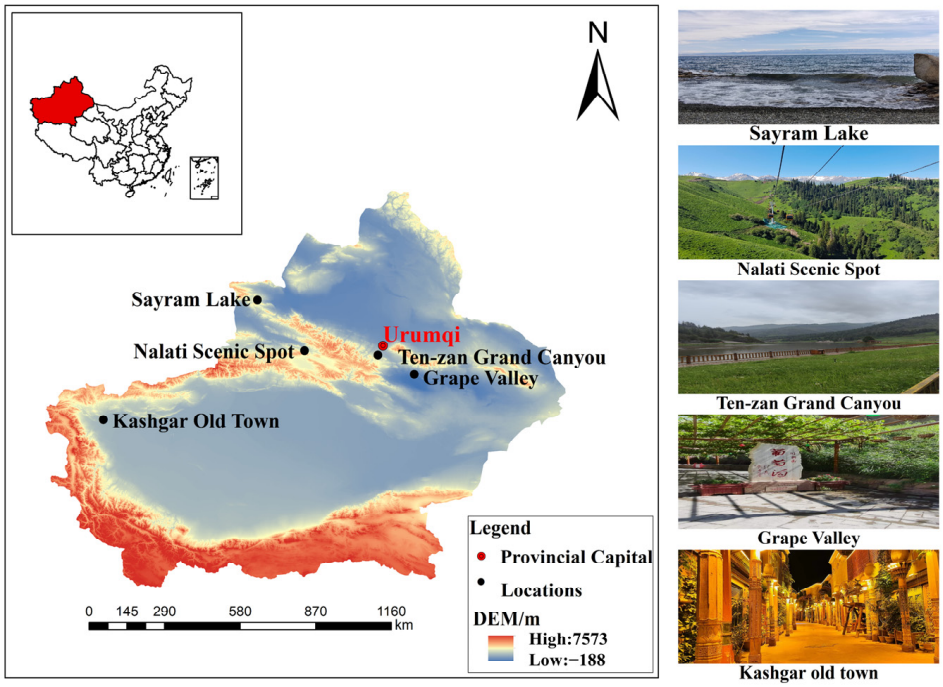


Figure 2. The location of the study area.

3.2. Questionnaire Design

The questionnaire was designed with the "14th Five-Year" Plan for Cultural and Tourism Development as its foundation. It drew on the research accomplishments of scholars such as Li [7], Wang [5], Li [32], and Deng [39], but it was also tailored to reflect the realities of Xinjiang. The survey encompassed a range of topics, including tourism information, transportation, administrative regulation, safety assurance, smart tourism, and public services for convenience and welfare. Considering the fact that tourism public services in Xinjiang are primarily government-led, and only certain 5A scenic areas have restricted accommodation facilities due to environmental protection, this study focused on government-led or primarily government-provided tourism public services. Unlike the evaluation systems of Lyv et al. [40], which included accommodation and other public products that are part of corporate service quality assessments, this study concentrated on analyzing smart tourism, as well as convenience and welfare public services, thereby aiming to propose future directions for the development of tourism public services.

The questionnaire comprised two sections. The first collected demographic data (gender, age, career, number of visits to Xinjiang, monthly income, and education level) and tourist behavioral characteristics (number of visits, type of companions, outing method, content of interest, and information source channel). The second part evaluated the tourist perception of the importance and satisfaction levels across various dimensions of tourism public service quality in Xinjiang. These dimensions included public services for tourism safety assurance, convenience and welfare, smart tourism, transportation and information, and administrative regulation. The safety assurance, transportation, and information services were primarily based on the research of Li [17] and Ma [9], while the smart tourism services drew on the findings of Jin [23] and Lu [41]. Based on the above literature, for this paper, we invited experts and scholars in the tourism industry of Xinjiang to discuss the scientificity of the questionnaire before the questionnaire was formally distributed, and we amended the indicators based on the results of the expert discussion. Following field research, the final questionnaire comprised a system of 47 evaluation indicators. A 5-point Likert scale was utilized for scoring, ranging from very dissatisfied to very satisfied. Respondents rated each of the 47 specific items based on their attitudes, and they scored them from 1 to 5 accordingly.

3.3. Methodology

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to construct and validate the evaluation index body system [42]. In this paper, the EFA method was used to extract the public factors of the questionnaire and construct the model, and the CFA to validate the goodness of fit between the collected data and the theoretical model, which was performed in order to establish and validate the evaluation system of visitor satisfaction in Xinjiang 5A scenic spots (including the target layer, constraint layer, and indicator layer).

The *t*-test, specifically the paired-sample *t*-test in this study, is a commonly used mean difference test in questionnaire analysis that allows for the comparison of relationships between groups [43]. The evaluation system of this study for public services in Xinjiang tourism necessitated comparing whether significant differences exist between the importance and satisfaction values of each of the 47 indicators. If the derived value is positive, it indicates that tourist satisfaction with specific public service indicators exceeds their perceived importance; a negative value suggests that tourists deem their satisfaction with specific indicators lower than their importance. The difference reflects the discrepancy between tourist satisfaction and the importance they attribute to these factors.

Importance–performance analysis (IPA) is a method that draws a four-quadrant matrix based on the evaluated indicators' importance and satisfaction levels [10]. The average values of importance and satisfaction serve as the boundaries within the matrix, which helps with distinguishing different quadrants and forming the IPA evaluation matrix. In this study, we applied IPA to investigate tourist satisfaction, thereby exploring the existing issues in the development of public services in Xinjiang tourism, as well as discussing and forecasting future research and development directions.

4. Results

4.1. Demographic Information

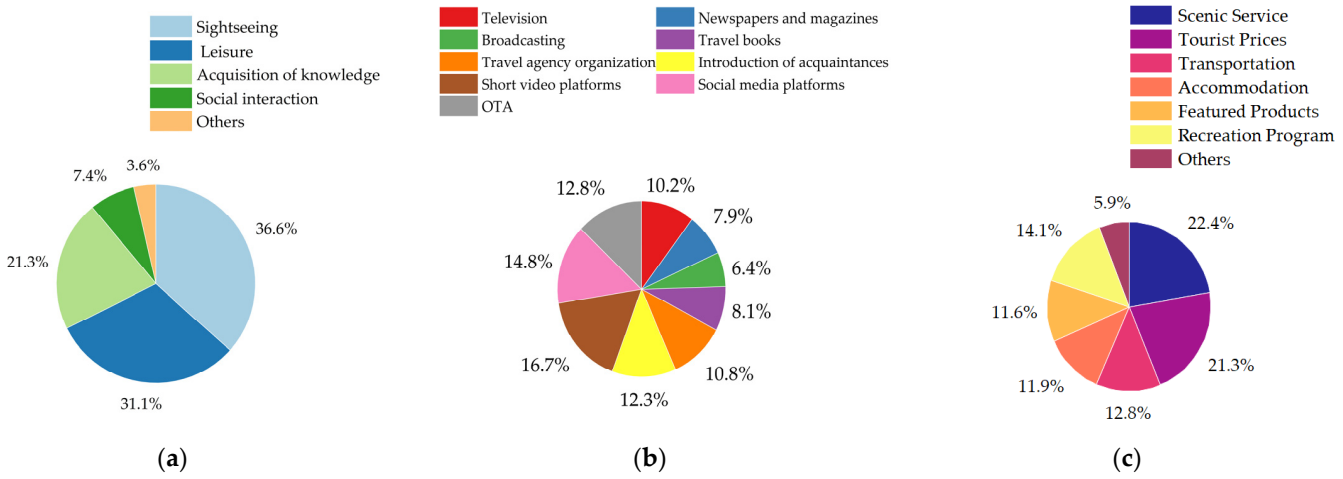
Based on the first part of the 1122 valid questionnaires, a descriptive analysis of the tourist demographic information was conducted (Table 1). The survey interviewed 593 male tourists (52.9%) and 529 female tourists (47.1%). The age of the respondents was primarily concentrated among young and middle-aged adults, i.e., those aged 25–44 years, accounting for 497 respondents (44.3%). The educational level of the tourists mainly centered around bachelor's or associate degrees, totaling 701 respondents (62.5%). The interviewees included 275 corporate employees (24.5%), followed by students, self-employed individuals, and professionals (e.g., teachers and doctors). The monthly income level of the tourists predominantly ranged between CNY 4000 to 6999, with 431 respondents (38.4%) and 242 respondents (21.6%) earning less than CNY 3000 per month, which was likely due to a substantial proportion of students with limited living expenses among the interviewees (this article was processed on 12 September, when the exchange rate of CNY to USD was 1:7.1986). The purpose of travel (a), information source channels (b), and content of interest (c) are presented in the following charts (Figure 3).

4.2. Questionnaire Reliability and Validity Test

SPSS 26.0 software was employed to filter, purify, and analyze the questionnaire data related to public services in Xinjiang tourism, with the aim of constructing a scientifically sound and reliable tourist satisfaction evaluation system. Initially, the data underwent reliability and validity analysis. The results of the reliability analysis showed a Cronbach's alpha coefficient of 0.922, thus indicating a high internal consistency among the questionnaire indicators. The Kaiser–Meyer–Olkin (KMO) measure was 0.921, signifying a suitable level of sampling adequacy for factor analysis. Bartlett's test of sphericity yielded a chi-square value of approximately 9817.113, which was deemed significant at the 0.000 level ($p < 0.001$), thus indicating the presence of common factors among the variables and making the data highly suitable for exploratory factor analysis.

Table 1. Demographic characteristics of the samples (N = 1122).

Projects	Type	Number	%	Projects	Type	Number	%
Gender	Male	593	52.9	Monthly income	Under 3000 CNY	242	21.6
	Female	529	47.1		3000–3999 CNY	151	13.5
Age	Under 14 years old	47	4.2		4000–6999 CNY	431	38.4
	15–24 years old	221	19.7		7000 CNY or more	298	26.6
	25–44 years old	497	44.3	Outing method	Freedom to travel	270	24.1
	45–64 years old	295	26.3		Travel with a group	308	27.5
	65 years and over	62	5.5		Self-driving tours	344	30.7
Education level	Junior high school and below	96	8.6		Semi-self-service tour	86	7.7
	High school	188	16.8		Unit organization	97	8.6
	College/bachelor's degree	701	62.5		Other	17	1.5
	Master's and above	137	12.2	Number of visits	1 or 2 times	628	56
Career	Public servant	93	8.3		3–4 times	320	28.5
	Student	234	20.9		5 times or more	174	15.5
	Corporate staff	275	24.5	Type of companions	All alone	67	6
	Individual businesses	192	17.1		Accompanied by family or friends	840	74.9
	Professionals (e.g., doctors, teachers, or those soon-to-be)	140	12.5		Colleague	158	14.1
	Soldier	12	1.1		Other	57	5.1
	Others	176	15.7				



(**a**) (**b**) (**c**)

Figure 3. Other information. (**a**) Tourist visitation patterns. (**b**) Information source channels. (**c**) Content of interest.

4.3. Construction of the Xinjiang Tourism Public Service Evaluation System

Exploratory factor analysis was used to determine the dimensions of tourist satisfaction (Table 2). The 47 items in the questionnaire were analyzed using principal component analysis to extract common factors, and Kaiser's varimax rotation was also applied. The cumulative variance explained reached 61.81%, thereby indicating that the four extracted common factors could explain over 60% of the original indicator information; in addition, this also demonstrated a high degree of explanation and good structural validity for the retained problem items. According to the rotated component matrix and through considering the correlations among the original problem items, the four extracted common factors were identified as the constraint layer. They were sequentially named as public services for tourism safety assurance, convenience and welfare, and smart tourism; public services for tourism transportation and information; and public services for tourism administrative regulation. Certain indicators within administrative regulatory public services had lower

factor loadings; however, since their content is closely related to public services in tourism administrative regulation, the decision was made to retain these indicators in the study.

Table 2. Xinjiang tourism performance evaluation system.

Constraint Level	Indicator Layer	Factor Load	Eigenvalue	Amount of Explained Variation
Tourism Safety Assurance Public Services (SA)	Clear safety guidelines and warning systems (S1)	0.852	11.828	25.166
	Authentic promotion of tourist destinations (S2)	0.849		
	Focus on protecting the rights of tourists (S3)	0.845		
	Perfect safety and security mechanism (S4)	0.820		
	Tourist sense of security (S5)	0.777		
	Sound emergency plan (S6)	0.776		
	Focus on personnel training (S7)	0.757		
	Complete safety facilities (S8)	0.564		
Tourism Convenience and Smart Public Services (CS)	Stereoscopic, intelligent micro-media platform (C1)	0.804	10.604	22.562
	Intelligent car park (C2)	0.784		
	Scenic spot electronic card (C3)	0.765		
	One-click rescue (C4)	0.757		
	Electronic map (C5)	0.753		
	Self-guide QR code (C6)	0.744		
	Face recognition system (C7)	0.743		
	Tourism booking applet (C8)	0.741		
	One-click smart tour (C9)	0.723		
	Free access to leisure facilities (C10)	0.671		
	Well-developed public recreational facilities (C11)	0.668		
	Promotion of paid leave system (C12)	0.623		
	Adequate toilet facilities (C13)	0.621		
	Convenient access to publicity materials (C14)	0.617		
	Organization of festivals (C15)	0.581		
	Free coupon distribution (C16)	0.569		
	Level of community participation (C17)	0.092		
Tourism Transport and Information Public Services (TI)	Transportation services at central hubs (T1)	0.788	4.769	10.146
	Traffic guidance signs (T2)	0.788		
	Affordable transport (T3)	0.781		
	Convenient transport (T4)	0.752		
	Timely release of information (T5)	0.751		
	Direct traveling lines to scenic spots (T6)	0.748		
	Multiple publishing channels (T7)	0.745		
	Clear road directions (T8)	0.744		
	Reliable information (T9)	0.739		
	Smooth traffic (T10)	0.733		
	Wide audience for information (T11)	0.729		
	Accurate information (T12)	0.709		
	Comprehensive information (T13)	0.623		

Table 2. *Cont.*

Constraint Level	Indicator Layer	Factor Load	Eigenvalue	Amount of Explained Variation
Tourism Administrative Regulatory Public Services (AR)	Focus on sustainable development (A1)	0.677	1.851	3.939
	Highly publicized content (A2)	0.627		
	Tourism consumer education (A3)	0.282		
	Prompt resolution of complaints (A4)	0.630		
	Food and beverage supervision (A5)	0.563		
	Smooth complaint channels (A6)	0.289		
	Timely handling of emergencies (A7)	0.283		
	Market regulation in place (A8)	0.304		
	Focus on standardization (A9)	0.237		

4.4. Confirmatory Factor Analysis

In this paper, confirmatory factor analysis of the scales was conducted using AMOS 25 to test the convergent and discriminant validity of the scales. The fit of the measurement model was as follows: $\chi^2/df = 2146.919/1028 = 2.088$ (<3); $p = 0.00$; RMSEA = 0.065 (<0.08); IFI = 0.907 (>0.9); and CFI = 0.906 (>0.9). The fit metrics were within the fitness criteria and were suitable for confirmatory factor analysis. In terms of convergent validity, the factor loading values of all items were greater than 0.5, and all were significant at the 0.1% level, thus indicating that the items effectively reflected the nature of the latent variables being measured. The composite reliability of the latent variables were all greater than 0.7, and the average extracted variance was greater than 0.5, which indicated good convergent validity (Table 3). The square root of the mean extracted variance of each latent variable was greater than the correlation coefficient between the latent variables (Table 4). Therefore, the scale developed in this study has a high validity.

4.5. Perceived Importance-Satisfaction Difference Analysis

To gain a deeper understanding of the overall characteristics of Xinjiang's tourism public services, a further comparison and analysis of the average values of each common factor was conducted (Table 5). The comprehensive evaluation indicated that tourists have a high overall satisfaction with Xinjiang's tourism public services, thus suggesting high satisfaction with tourism safety assurance services; however, improvements are still needed in key areas. As Tosun [44] advised, in Likert five-point scale measurements, item mean values of 1.0–2.4 indicate low scores, 2.5–3.4 suggest neutrality, and 3.5–5.0 denote high scores. As shown in Table 3, the data revealed that the overall average values for satisfaction and importance in Xinjiang's tourism public service quality were 3.90 and 3.97, respectively, thus indicating a generally satisfactory level. For the secondary indicators, apart from the wide audience for information and comprehensive information, significant differences were observed between the importance and performance of the remaining indicators. The average satisfaction levels of Tourism Safety Assurance Public Services and Tourism Administrative Regulatory Public Services exceeded their average importance levels of 3.77 and 3.63, respectively, and they were also higher than the overall average satisfaction level. Although the satisfaction level of 3.97 for Tourism Transport and Information Public Services was lower than its average importance level, it was still above the overall average.

Table 3. Confirmatory factor analysis results.

Latent Variable	Items	Estimate	Composite Reliability	Average Variance Extracted and Its Square Root
Tourism Safety Assurance Public Services (SA)	S1	0.743	0.902	0.538 (0.733)
	S2	0.639		
	S3	0.767		
	S4	0.776		
	S5	0.798		
	S6	0.862		
	S7	0.664		
	S8	0.577		
Tourism Convenience and Smart Public Services (CS)	C1	0.652	0.965	0.621 (0.788)
	C2	0.663		
	C3	0.880		
	C4	0.654		
	C5	0.892		
	C6	0.948		
	C7	0.897		
	C8	0.748		
	C9	0.922		
	C10	0.921		
	C11	0.911		
	C12	0.699		
	C13	0.721		
	C14	0.649		
	C15	0.700		
	C16	0.672		
	C17	0.729		
Tourism Transport and Information Public Services (TI)	T1	0.714	0.93	0.508 (0.713)
	T2	0.759		
	T3	0.708		
	T4	0.631		
	T5	0.711		
	T6	0.874		
	T7	0.705		
	T8	0.601		
	T9	0.678		
	T10	0.663		
	T11	0.763		
	T12	0.700		
	T13	0.721		
Tourism Administrative Regulatory Public Services (AR)	A1	0.854	0.938	0.632 (0.795)
	A2	0.889		
	A3	0.611		
	A4	0.764		
	A5	0.712		
	A6	0.907		
	A7	0.761		
	A8	0.684		
	A9	0.915		

Table 4. Correlations.

	SA	CS	TI	AR
SA	0.733			
CS	0.505	0.788		
TI	0.417	0.543	0.713	
AR	0.468	0.614	0.276	0.795

In addition to the four dimensions of the constraint layer, the ranking of the importance of the 47 specific factors in the index layer showed that the 10 factors tourists subjectively considered most important were transportation services at central hubs (T1, 4.39), free coupon distribution (C16, 4.37), accurate information (T12, 4.36), smooth traffic (T10, 4.27), clear road directions (T8, 4.25), convenient transport (T4, 4.25), affordable transport (T3, 4.24), free access to leisure facilities (C10, 4.23), direct traveling lines to scenic spots (T6, 4.21), and adequate toilet facilities (C13, 4.2). However, all of these factors had negative performance–importance (P-I) values, indicating they did not meet tourist expectations and should be prioritized for improvement by the scenic areas and government departments. The satisfaction ranking revealed that the ten factors tourists were most satisfied with included perfect safety and security mechanism (S4, 4.46), focus on protecting the rights of tourists (S3, 4.3), market regulation in place (A8, 4.29), clear safety guidelines and warning systems (S1, 4.27), tourism consumer education (A3, 4.27), smooth complaint channels (A6, 4.25), timely handling of emergencies (A7, 4.22), authentic promotion of tourist destinations (S2, 4.2), and level of community participation (C17, 4.18). These factors had positive P-I values; as such, they performed above tourist expectations, thus highlighting the strengths of Xinjiang's tourism public services.

Comparing the importance and satisfaction levels revealed significant disparities, i.e., small P-I values, for the following five factors with the largest differences: stereoscopic, intelligent micro-media platform (3.45, 4.12); one-click smart tour (3.39, 4.06); one-click rescue (3.44, 4.11); face recognition system (3.35, 4); and tourism booking applet (3.49, 4.13). These were the main indicators affecting overall tourism satisfaction, thus indicating a poor tourist experience and a greater challenge in meeting psychological expectations. Predominantly falling under the smart tourism evaluation system, these five indicators did not meet tourist expectations and should be focal points in future public service construction in tourism, even if they require more investment and manpower.

4.6. Importance–Satisfaction Evaluation

Based on the calculated average values of importance and satisfaction, this study employed IPA analysis to construct a four-quadrant matrix of the average importance and satisfaction values of each indicator. The specific importance and satisfaction values of each indicator were plotted within the quadrant matrix for interpretation and analysis. The matrix, as illustrated in Figure 4, was constructed with the average values of all importance and satisfaction (3.97, 3.9) as the origin, which was achieved using horizontal coordinates for importance and vertical coordinates for satisfaction. Labels S1 to S8 represent the indicators of the Tourism Safety Assurance Public Service; labels C9 to C25 represent the indicators of the Tourism Convenience and Smart Public Services; labels T1 to T13 represent the indicators of the Tourism Transport and Information Public Services; and labels A1 to A9 represent the indicators of the Tourism Administrative Regulatory Public Services.

Table 5. Differential analysis of the importance and performance levels of Tourism Public Services as judged by tourists.

Dimensionality	Indicators	Importance (I)			Performance (P)			P-I Value	t Value	Sig.
		Average	Sort	Average	Average	Sort	Average			
Tourism Safety Assurance Public Service (SS)	Clear safety guidelines and warning systems (S1)	3.77	35	3.76	4.27	4	4.24	0.50	−5.752	0.000
	Authentic promotion of tourist destinations (S2)	3.83	29		4.20	8		0.37	−3.311	0.001
	Focus on protecting the rights of tourists (S3)	3.77	35		4.30	2		0.53	−5.980	0.000
	Perfect safety and security mechanism (S4)	3.65	42		4.46	1		0.81	−8.099	0.000
	Tourist sense of security (S5)	3.73	38		4.13	15		0.40	−5.967	0.000
	Sound emergency plan (S6)	3.8	32		4.12	16		0.32	−4.756	0.000
	Focus on personnel training (S7)	3.74	37		4.17	10		0.43	−6.278	0.000
	Complete safety facilities (S8)	3.78	33		4.17	12		0.39	−8.099	0.000
Tourism Convenience and Smart Public Services (CS)	Stereoscopic, intelligent micro-media platform (C1)	4.12	17	4.07	3.45	41	3.59	−0.67	9.722	0.000
	Intelligent car park (C2)	3.99	28		3.37	46		−0.62	7.862	0.000
	Scenic spot electronic card (C3)	4.05	24		3.43	44		−0.62	7.895	0.000
	One-click rescue (C4)	4.11	19		3.44	42		−0.67	8.332	0.000
	Electronic map (C5)	4.04	25		3.44	43		−0.60	7.291	0.000
	Self-guide QR code (C6)	4.08	20		3.49	40		−0.59	7.932	0.000
	Face recognition system (C7)	4	26		3.35	47		−0.65	8.058	0.000
	Tourism booking applet (C8)	4.13	16		3.49	38		−0.64	8.107	0.000
	One-click smart tour (C9)	4.06	23		3.39	45		−0.67	8.391	0.000
	Free access to leisure facilities (C10)	4.23	8		3.61	35		−0.62	9.920	0.000
	Well-developed public recreational facilities (C11)	4.15	14		3.60	36		−0.55	7.269	0.000
	Promotion of paid leave system (C12)	3.83	29		3.49	37		−0.34	5.857	0.000
	Adequate toilet facilities (C13)	4.2	10		3.77	33		−0.43	4.942	0.000
	Convenient access to publicity materials (C14)	4.07	22		3.49	38		−0.58	10.114	0.000
	Organization of festivals (C15)	4	26		3.62	34		−0.38	5.620	0.000
	Free coupon distribution (C16)	4.37	2		3.81	32		−0.56	11.105	0.000
	Level of community participation (C17)	3.7	39		4.18	9		0.48	−5.316	0.000

Table 5. *Cont.*

Dimensionality	Indicators	Importance (I)			Performance (P)			P-I Value	t Value	Sig.
		Average	Sort	Average	Average	Sort	Average			
Tourism Transport and Information Public Services (TI)	Transportation services at central hubs (T1)	4.39	1	4.22	4.05	19	3.97	−0.34	5.121	0.000
	Traffic guidance signs (T2)	4.17	12		4.00	21		−0.17	2.321	0.021
	Affordable transport (T3)	4.24	7		3.96	25		−0.28	4.203	0.000
	Convenient transport (T4)	4.25	5		3.94	27		−0.31	4.415	0.000
	Timely release of information (T5)	4.12	17		3.90	30		−0.22	2.997	0.000
	Direct traveling lines to scenic spots (T6)	4.21	9		3.94	26		−0.27	3.851	0.000
	Multiple publishing channels (T7)	4.19	11		3.92	29		−0.27	3.549	0.000
	Clear road directions (T8)	4.25	5		3.99	22		−0.26	3.556	0.000
	Reliable information (T9)	4.17	12		3.92	28		−0.25	3.463	0.001
	Smooth traffic (T10)	4.27	4		3.90	31		−0.37	5.474	0.000
	Wide audience for information (T11)	4.08	20		3.97	23		−0.11	1.487	0.138
	Accurate information (T12)	4.36	3		4.14	14		−0.22	3.894	0.000
	Comprehensive information (T13)	4.15	14		4.04	20		−0.11	1.589	0.000
Tourism Administrative Regulatory Public Services (AR)	Focus on sustainable development (A1)	3.69	40	3.63	4.12	17	4.17	0.43	−5.041	0.000
	Highly publicized content (A2)	3.78	33		4.17	11		0.39	−4.717	0.000
	Tourism consumer education (A3)	3.55	44		4.27	5		0.72	−6.723	0.000
	Prompt resolution of complaints (A4)	3.67	41		4.07	18		0.40	−4.616	0.000
	Food and beverage supervision (A5)	3.81	31		4.16	13		0.35	−4.167	0.000
	Smooth complaint channels (A6)	3.52	46		4.25	6		0.73	−6.949	0.000
	Timely handling of emergencies (A7)	3.53	45		4.22	7		0.69	−6.475	0.000
	Market regulation in place (A8)	3.51	47		4.29	3		0.78	−7.775	0.000
	Focus on standardization (A9)	3.64	43		3.97	24		0.33	−4.748	0.000
Overall average		3.97			3.90					

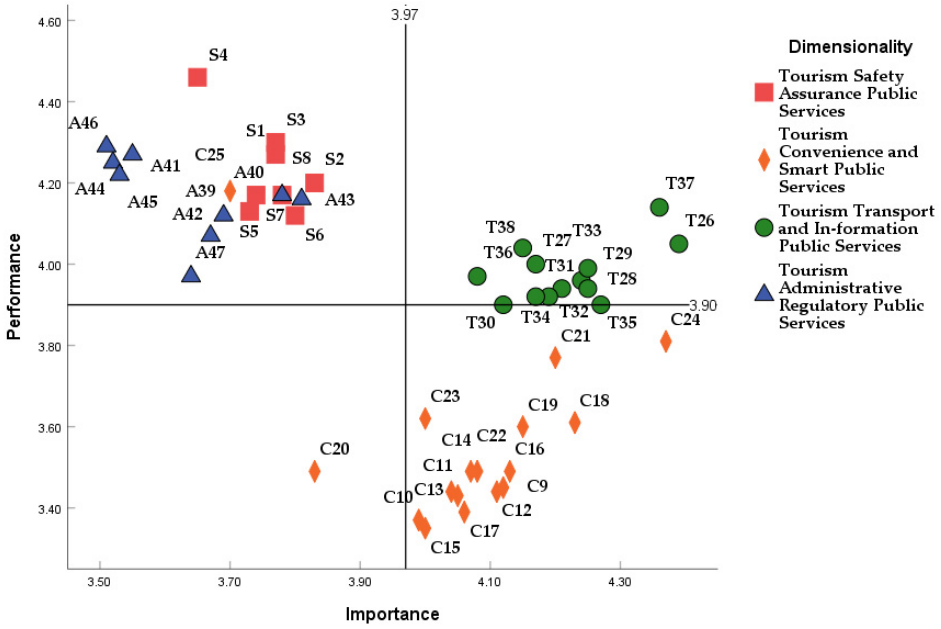


Figure 4. Quadrant matrix of importance-performance of tourists.

To gain insight into the overall characteristics of public services in Xinjiang's tourism, an analysis of the quadrant matrix was conducted to intuitively identify the strengths and weaknesses of the factors affecting tourist satisfaction assessments. The four quadrants of the matrix are as follows (as shown in Figure 4): Quadrant 1, "High Importance–High Satisfaction" (continue to maintain area); Quadrant 2, "Low Importance–High Satisfaction" (potential advantage area); Quadrant 3, "Low Importance–Low Satisfaction" (casual improvement area); and Quadrant 4, "High Importance–Low Satisfaction" (key improvement area). Out of the 47 indicators, most were distributed in Quadrants 1, 2, and 4; except for 20 of the indicators, the rest were spread across the other quadrants. The 20th indicator was the promotion of a paid leave system. Both local and non-local tourists in Xinjiang unanimously agreed that the introduction of a paid leave system is urgent. This indicator's performance is quite objective, and its successful implementation requires cooperation between the government and employers as a strategy through which to drive economic development through tourism and to ensure shared benefits for the people.

Quadrant 1 includes indicators such as transportation services at central hubs (26), clear traffic guidance signs (27), affordable transport (28), convenient transport (29), timely release of information (30), direct travel lines to scenic areas (31), multiple publishing channels (32), clear road directions (33), reliable information (34), smooth traffic (35), wide audience for information (36), accurate information (37), and comprehensive information (38). These indicators, with high satisfaction and importance levels, suggest that recent advancements in Xinjiang's tourism sector benefit from the development and improvement of transportation and internet infrastructure. Improved accessibility to cities and tourist spots has reduced the time and economic costs for tourists, thereby enhancing safety and overall experience, as well as stimulating tourism market demand. Additionally, the high satisfaction level of information services indicates the effectiveness of TV media, online OTA platforms, WeChat, and Weibo, as well as other such platforms, in facilitating two-way communication with tourists. The public information content in the tourism services met most of the tourist needs. The focus should now be on maintaining the timeliness of information access, regulating publishing channels, and the practicality of information.

Quadrant 2 contains the factors that represent "Low Importance–High Satisfaction", including clear safety guidelines and warning systems (1), authentic promotion of tourist destination (2), focus on protecting the rights of tourists (3), perfect safety and security mechanism (4), tourist sense of security (5), sound emergency plan (6), focus on personnel

training (7), level of community participation (25), focus on sustainable development (39), highly publicized content (40), tourism consumption education (41), prompt resolution of complaints (42), food and beverage supervision (43), smooth complaint channels (44), timely handling of emergencies (45), market regulation in place (46), and focus on standardization (47). This suggests that Xinjiang has invested significantly in these aspects of tourism public services, thus resulting in high tourist satisfaction. Most of these factors, mainly concerning tourism safety assurance and government administrative regulation, are protective resources for scenic areas, thereby indicating effective governmental actions in safeguarding tourists' rights and contributing to the stable and sustainable development of Xinjiang's tourism industry.

Quadrant 4 contains the 14 factors that represent "High Importance–Low Satisfaction", including intelligent car park (10), scenic spot electronic card (11), one-click rescue (12), electronic maps (13), self-guide QR codes (14), facial recognition system (15), tourism booking applet (16), one-click smart tourism (17), free access to leisure facilities (24), well-developed public leisure facilities (19), adequate toilet facilities (21), convenient access to publicity materials (22), and organization of festivals (23). The tourists regarded these factors as particularly important but not highly satisfactory. These factors are key to enhancing the quality of public services in Xinjiang's tourism and require further strengthening. Notably, tourists consider "Facial recognition entry" and "Intelligent parking lots" as important, yet these had the lowest satisfaction levels, thus indicating that technology's role in improving the quality of public tourism services is limited at this stage. The overall level of smart tourism was found to be low; in some scenic areas, the implementation of smart tourism public services was inadequate and had not effectively reduced waiting times for tourists entering the area. Additionally, certain launched smart tourism platforms lack regular maintenance, with some features not functioning or being discontinued. These two issues deserve attention for service quality improvement in scenic areas and represent key directions for future improvements. If well developed, these aspects could become significant advantages for the high-quality development of Xinjiang's tourism industry, thus further enhancing tourist satisfaction with public tourism services.

5. Discussion

5.1. Index System Construction and Evaluation Method Analysis

Considering the increasing demand for the emerging tourism market in western China and the provision of tourism public services led by the government, this paper endeavored to categorize and summarize the content of government-led tourism public services. It employed paired sample *t*-tests and importance–performance analysis (IPA) to examine the specific performance of public services in Xinjiang's tourism sector. Exploratory factor analysis [17] and IPA [45] have been widely used in the tourism public service evaluation literature, but there is still a dearth of detailed dimension division and analysis of tourism public services in western China. Most studies have focused on central and eastern China, with a particular lack of research on whether smart tourism services in the western region can meet tourist needs. This paper builds upon previous case studies, and it selected five 5A-rated scenic areas representing different types of tourism resources as subjects for a multi-case empirical study, thus avoiding the one-sidedness of single-case research results. Certain scholars have used the analytic hierarchy process to analyze the weight of related statistical indicators [46] in order to evaluate the level of regional tourism public services, or they have utilized the SEM model to assess and validate the level of tourism transportation services [47] or the intention to revisit [48]. This paper, drawing on existing index system construction methods through exploratory factor analysis and confirmatory factor analysis, divides the evaluation system into two levels, thereby expanding the coverage of evaluation content. It comprehensively considers a tourism public service evaluation system comprising four dimensions and quantitatively analyzes it using the importance–performance analysis model.

5.2. Analysis of the Mechanism Impacting Xinjiang's Tourism Public Services

The results of this paper indicate that tourists generally have a favorable assessment of public services in Xinjiang's tourism sector. The satisfaction and importance of tourism safety assurance services in Xinjiang, when compared to those in the Jing-Jin-Ji region and the tourism city of Xiamen [5,8], were relatively high. This high satisfaction is partly due to alignment with tourist expectations, and it also partly reflects the overall good level of tourism safety assurance services. The high quality of these services in Xinjiang largely benefits from effective public security and administrative law enforcement. The overall satisfaction with Xinjiang's tourism administrative regulatory services was found to be high, with indicators distributed in the 'continue to maintain' and 'potential resources' areas. Compared to Ma's [22] survey results in Shanxi's Pingyao Ancient City, the level of tourist satisfaction was higher, and it was found to be closely related to the strengthened tourism market regulation in various places in Xinjiang in recent years. Most of Xinjiang's tourism transportation and information services are in the 'continue to maintain' area as they perform well compared to the existing literature data; this is likely due to Xinjiang benefiting from the accelerated progress of major projects in highways, railways, and civil aviation in recent years, and it has clearly played an important role in promoting stable growth in tourism.

Compared with other tourism public services, the dimensions of smart tourism and public-benefiting tourism services had higher importance but lower satisfaction scores, thus indicating the areas needing significant improvement. Firstly, tourist dissatisfaction with public-benefiting tourism services at tourist destinations in Xinjiang suggests that the current level of such services provided in scenic areas does not meet tourist needs. This finding is consistent with Chen's [49] research, which examined the relationship between tourists and public-benefiting tourism services in Yichun and proposed the need to focus on the construction of public toilets, rest facilities, and tourism benefit activities. Secondly, the low satisfaction with smart tourism-related indicators implies a high demand for services such as facial recognition entry, smart parking, and electronic all-in-one cards in scenic areas, thus indicating a serious lack of such services currently and a low level of tourist experience. This also reflects the significant impact of smart tourism public service construction on tourist satisfaction, which also aligns with Zuo's [50] conclusion, which studied Shanghai Disneyland and found that smart tourism construction significantly influences tourist satisfaction. The aforementioned further suggested enhancing the role of smart tourism in park construction, the importance of smart information construction in smart tourism, and strengthening the promotion of smart tourism services. Thirdly, most of the indicators of public-benefiting and smart tourism services were found to be in the 'priority improvement' area, which significantly affected the overall satisfaction with the tourism public services. This indicated that the supply of these tourism services did not meet tourist needs. The emergence of this situation was found to be mainly due to the economic level being a decisive factor in the construction and development of an information society [51]. With the relatively weak economic foundation in the western region, the construction and application of modern tourism information technology are not yet well developed; furthermore, there has been a failure to fully utilize technology's innovative capabilities in tourism, and public-benefiting services are not being effectively implemented. This is consistent with Li's [52] research conclusion, which studied the relationship between smart tourism and public-benefiting tourism services and tourist satisfaction in the Wuyi Mountain region. Li noted that smart services and public-benefiting services require substantial financial investment and do not bring noticeable reputation and performance boosts in the short term. The aforementioned study proposed establishing a tourism public service development model led by the government with enterprise participation and social coordination.

5.3. Policy Implications

(1) Continuously strengthening the quality of tourism safety assurance services. At this stage, existing tourism safety services should be maintained, and they should respond promptly to different tourist safety needs. Responsibilities should be clarified and emphasis placed on the safety education and training of personnel; in addition, safety management work should be streamlined for efficiency, and tourist recognition and appreciation of safety measures in scenic areas should be improved. Tourists should also enhance their own safety awareness and self-rescue capabilities.

(2) Deepening the quality of tourism administrative regulatory services. The quality of administrative regulatory services has been a focus of improvement in Xinjiang's tourism public services in recent years and certain effects have been achieved. This research was conducted during the peak period of tourism in Xinjiang, and the comprehensive assessment of tourism supervision and management by tourists was high, thus indicating a qualitative improvement in the regulatory work of Xinjiang's tourism market regulatory departments. On the one hand, enforcement and inspection were found to be strengthened with detailed management so as to standardize the tourism market order; on the other hand, strict measures are taken against illegal activities such as price fraud. In the future, Xinjiang's tourism administrative regulatory services should continue to strengthen the ongoing supervision of illegal activities like price fraud. Establishing a multi-channel complaint platform to encourage social supervision is advisable. Simultaneously, detailed management and humanized services should be developed and perfected. Considering the diverse tourism administrative regulatory needs brought about by diverse tourism styles, administrative regulatory departments can consider integrating and systematizing resources based on existing tourism public service platforms, thereby reducing management costs while providing targeted and personalized tourism administrative regulatory services to enhance overall service levels.

(3) Emphasizing the improvement of tourism transportation and information services. On the one hand, accelerate the construction of public transportation in tourism, optimize and upgrade the accessibility and connectivity of existing transportation networks, and strengthen the construction of transportation facilities where comprehensive conditions allow. On the other hand, tourism public transportation should be combined with network informatization, including the optimization of information dissemination channels, as well as ensuring that reliable and timely public information services in tourism are maintained, as they are key to enhancing tourism information service platforms [53]. Based on the deep integration of information services with actual tourism transportation conditions, improve tourism information content, such as timely publishing of tourist flow and weather conditions in scenic areas, and conduct early diversion when there is heavy traffic to improve scientific early warning capabilities.

(4) Accelerating the reform of tourism public-benefiting and smart tourism services, as well as speeding up the construction and improvement of leisure facilities. The government, based on local fiscal revenue, should subsidize the construction of leisure facilities, and they should allow departments or enterprises providing such services to reduce or waive tickets for public leisure facilities. Public health service facilities have seen significant improvements in recent years. In the future, scenic areas should improve sanitation facilities based on tourist flow and demand, thus ensuring adequate and reasonable numbers, convenience, and practicality. By paying attention to the text and layout design of tourism promotional materials, the transliteration work of tourism promotional materials should be solidly advanced; in addition, the voice and story of Xinjiang will thus be spread. This will strengthen the hosting of tourism festivals and community participation in tourism, thereby driving tourism economic development with festival hosting. At this stage, a series of supporting smart tourism services, such as smart parking and facial recognition entry, urgently need improvement. The construction in fields such as 5G, big data, cloud computing, the Internet of Things, artificial intelligence, and virtual reality should be emphasized [54]. In the future, we should continue to accelerate the

construction of internet broadband, the government should plan ahead, regular maintenance and inspections of the launched smart tourism systems should be conducted, the integration of culture and tourism should be innovated upon, dual-driven talents should be introduced, and the multi-ethnic local cultural characteristics of Xinjiang should be integrated. Therefore, if tourism destinations can focus on this dimension, it will help further analyze the potential resource advantages and improvement factors of tourism public services. In addition, such an approach will help to support the other three dimensions, as well as aid in coordinating the optimization and upgrading of Xinjiang's tourism public service supply system, thus allowing tourism public services to benefit the public more. The overall level of Xinjiang's tourism public services still needs improvement, and there is a long way to go in promoting the high-quality development of comprehensive tourism in Xinjiang.

This study also has its limitations. The evaluation of tourism services requires a comprehensive study incorporating multiple dimensions and factors, but this research solely focused on tourists and their post-visit perceptions at tourism sites without utilizing a longitudinal survey approach that compared pre- and post-visit perceptions. Future research could expand in this area. Furthermore, reciprocal studies involving both tourism public service providers and tourist perception evaluations should be conducted to further refine tourism public service evaluation research (which will likely be a key focus for subsequent studies).

5.4. Future Research Prospects

Given that the evaluation of tourism services requires a comprehensive study incorporating multiple dimensions and factors, this research was limited in that it solely focused on tourist post-visit perceptions at tourism sites; thus, it lacked a longitudinal survey approach that compares pre- and post-visit perceptions. Furthermore, future research could also involve a reciprocal study of the perceptions and evaluations of both tourism public service providers and tourists, which will be a key focus for further refining tourism public service evaluation research.

6. Conclusions

Building upon the relevant literature, this study utilized exploratory factor analysis and confirmatory factor analysis to construct an evaluation system for public services in Xinjiang's tourism sector and employed the importance–performance analysis (IPA) model for a comprehensive empirical analysis; this approach yielded evaluative and research findings. (1) The tourism public service evaluation index system of this study comprised four dimensions: tourism safety assurance public services, tourism convenience and public-benefiting smart tourism services, tourism transportation and information public services, and tourism administrative regulatory public services. (2) There were significant differences found between the satisfaction and importance levels of the different indicators. The average expectation or importance value for Xinjiang's tourism public service evaluation indicators was 3.97, with the highest value being 4.39 and the lowest 3.51; moreover, the average satisfaction or performance value was 3.90, with the highest value being 4.46 and the lowest 3.35, thus indicating that there is room for further improvement in Xinjiang's tourism public services. (3) In the quadrant chart of the IPA method, the dimensions of smart tourism and public-benefiting services primarily exhibited high importance–low satisfaction. The research findings of this paper provide valuable insights for policy planning and the construction of tourism public services. The management layer of government-led tourism public services should focus on enhancing the quality of smart tourism and convenient public services to improve tourist visiting experiences. Future research should continue to explore these aspects to enhance the overall quality and effectiveness of tourism public services and promote high-quality tourism development in regions like Xinjiang.

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