Research on Influence Factors of Dynamic Recreation Value of Desert Scenic Spots

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Abstract This paper summarizes present research situation of influence factors of recreation values. Based on the causality diagram of recreation value of desert scenic spots, it qualitatively analyzes direct and indirect functions and mechanism for external and internal influence factors to recreation values of desert. Through experts' investment and weighting count, it gives out importance of influence factor. The research results show that: recreation values of desert scenic spots are closely related with tourist reception and travel cost; recreation expense courts for high percentage in the per capita consumption; abundance of tourism products and natural endowment of recreation resources have great influence on recreation value of desert scenic spot.

Keywords Desert scenic spot · Recreation value · Environmental carrying capacity · Influence factors · Causality diagram

1 Research Significance

Desert tourism is based on desert tourism attractions to develop tourism activities of which can satisfy the psychological demands of the travelers, such as exploration, expedition, seeking novelty, and knowledge (Zhang et al. 2003; Wei and Wang 2008). The research on influence factors of desert recreation value is of great significance reflected in the following aspects: it is favorable to real-time monitor operation state and management efficiency of desert scenic spot; provide

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a basis for pricing a rational ticket and enhance the management level; adjust the tourism product structure for desert scenic spot, guide its transformation and upgrading, and encourage innovations of scenic spot in aspects of product, technology and management concept, etc., realize recreation value of the scenic spot and great-leap-forward development of economic benefit; realize the paid use of tourism resources, coordinate contradiction between protection and development of resources; and broaden the financing business of tourism enterprise and promote introduction of investment.

This study reviews the present situations and existed shortages during researches on influence factors of recreation value; taken desert tourism scenic spot as a complex system composed of the ecological, economic, and social subsystems, it adopts the system dynamics method to draw a causality diagram for the influence factors of recreation value of desert scenic spot; it also qualitatively analyzes the direct or indirect action and mechanism of each external and internal factor to the recreation value; finally through the expert investigation and weight calculation, the importance of these factors on recreation value are determined.

2 Research Review

2.1 Assessment Method

The international relevant researches show that assessment on the influence factors of recreation value of tourism resources is mainly based on the characteristics of the assessment method and evaluation object. Due to great operation difference during application, the factors influenced the accounting result are also different for various evaluation methods.

Presently, the methods for calculation of tourism resources value include Travel Cost Method (TCM), Contingent Value Method (CVM), Expenditure Method, Income Capital Method, etc., all of which involved two factors, namely tourist reception and tourists' average expense during calculation of resource value. At present, TCM is a relative mature and conventional method to account value of natural scenic spots without direct market price or environment resources, especially applicable to evaluation on enjoyment resources with tourism and entertainment functions, such as free or low charge natural scenic spots (Li and Liu 2010). CVM can evaluate not only on the direct value of environment resources, but also on its nonuse values. In China, CVM is only used to evaluate the economic value of natural ecological environment with results on the low side usually. Some researchers combined TCM and CVM to estimate tourism value. The evaluated value by TCM is often 20 ~ 30 % higher than that of VCM (Li and Liu 2010; Pearce and Moran 1995; Chen and Zhang 2001). Liu et al. (2006) used two TCM regression models to calculate the consumers' surplus value of Wulingyuan Scenic Area which are 8.75 and 9.21 times higher than evaluation results of CVM respectively.

2.2 Social Economics Attributes of Evaluation Object

The factors influenced on recreation value assessment include level of scenic spot, tourists' income and quantity, as well as population structure, and so on.

(1) *Population of tourist source* There are some correlation among factors, such as total population of tourist source, especially percentage of urban population, and travel rate of tourist source, the willingness to pay (WTP). A certain age range of urban population with fixed income belongs to the tourism subject. During the analysis on recreation value of Hefei Botanical Garden, a positive correlation is presented between nonagricultural population and number of tourists (Wu 2005). The correlation between nonagricultural population rate at tourist source of Wuyi Mountain and Wuyi Mountain tourist is not significant (Wu et al. 1992; Yi et al. 1996). The correlation between travel rate and population of each tourist source of Changbaishan Nature Reserve established by Xue et al. (1999) is also not significant.

(2) *Social and economic features of tourist* For the influence factors of tourists' attributes, the average monthly income versus WTP or travel rate, the opposite conclusion may be drawn due to the different study areas and survey data. For example of analysis in view of gender, WTP of men is higher than that of women (Liu et al. 2006). Gender may have extremely significant correlation with WTP, but also likely to no impact on it (Pearce and Moran 1995). Age may have significant correlation with WTP (Chen and Zhang 2001), but also likely to no impact on it (Pearce and Moran 1995; Liu et al. 2006). Tourists' career may have extremely significant correlation with WTP (Yu 2008), but also likely to no impact on it (Chen and Zhang 2001). Education background may have significant or extremely significant correlation with WTP (Chen and Zhang 2001; Liu et al. 2006), but also likely to no impact on it. Income level may have significant correlation with WTP, the higher tourist's income is, the higher the WTP will be, however, researches (Chen and Zhang 2001; Yu 2008) show that correlation between income level and WTP is not significant.

2.3 Limitations of the Previous Studies

It is inevitable to simplify the complex issues if the influence factors of travel value are only attributed to calculation method and tourist personal attributes. Except for calculation method and tourists' personal attributes, recreation value is also influenced by the complexity of various factors, including the social and economic conditions of tourist sources, category and grade of tourism resources, popularity and environmental carrying capacity of scenic spot, tourism expenses, tourist reception, and travel time. The tourist receptions of the scenic spot, travel

expenses, or consumers' WTP are the key influence factors of tourism value. Different tourism values have respective calculation methods; finally, all of them focus on how to determine tourist reception, travel expenses, or tourists' WTP of the tourist destination or scenic spot. The influence mechanism of these factors on recreation value is very complicated. In the existing study on recreation value, TCM considers less about tourist personal attributes, while CVM considers less about travel costs. The in-depth analysis is insufficient on the key influence factors of travel expenses and tourist's WTP.

3 Analysis on Influence Factor of Recreation Value of Desert Scenic Spot

This study focuses on the analysis on the influence factors of desert use value without consideration of influence factors of desert nonuse value. Desert use value refers to a sum of all expenses and travel time cost of whole process from departure to recreation, accommodation, and return (Meng and Chen 1994). A causality diagram (see Fig. 1) can be drawn for influence factors of desert scenic spot by the researchers according to the field survey on Inner Mongolia "Yinken" Xiangshawan, Ningxia Shapotou, Tengger Desert Wetland Park, and Inner Mongolia Tonghu desert tourism area, as well as analysis on the tourism resources of desert scenic spot and characteristics of recreation. The section below is to analyze recreation value of desert scenic spot on the basis of the causality diagram.

3.1 Influence Factor of Recreation Value of Desert Scenic Spot

3.1.1 External Factors of Recreation System Function

Total Population of Tourist Source

According to the tourist source, desert tourists can be dividend two types, namely urban/rural residents surrounding the desert and the inhabitants far away from the desert scenic spot. As the latter is concerned, the larger population scale can promise the higher percentage of residents to travel. For example of Shapotou and Tonghu Tourism Area, main tourist sources are Sichuan, Shaanxi, and Gansu provinces in the rush season. According to the demographic data of the sixth national population census in 2010, tourists from Sichuan, Gansu, and Shaanxi provinces were respectively 80.4182 million, 25.5752 million, and 7.3273 million, these provinces become main tourist sources of desert tourism in Ningxia and Inner Mongolia.

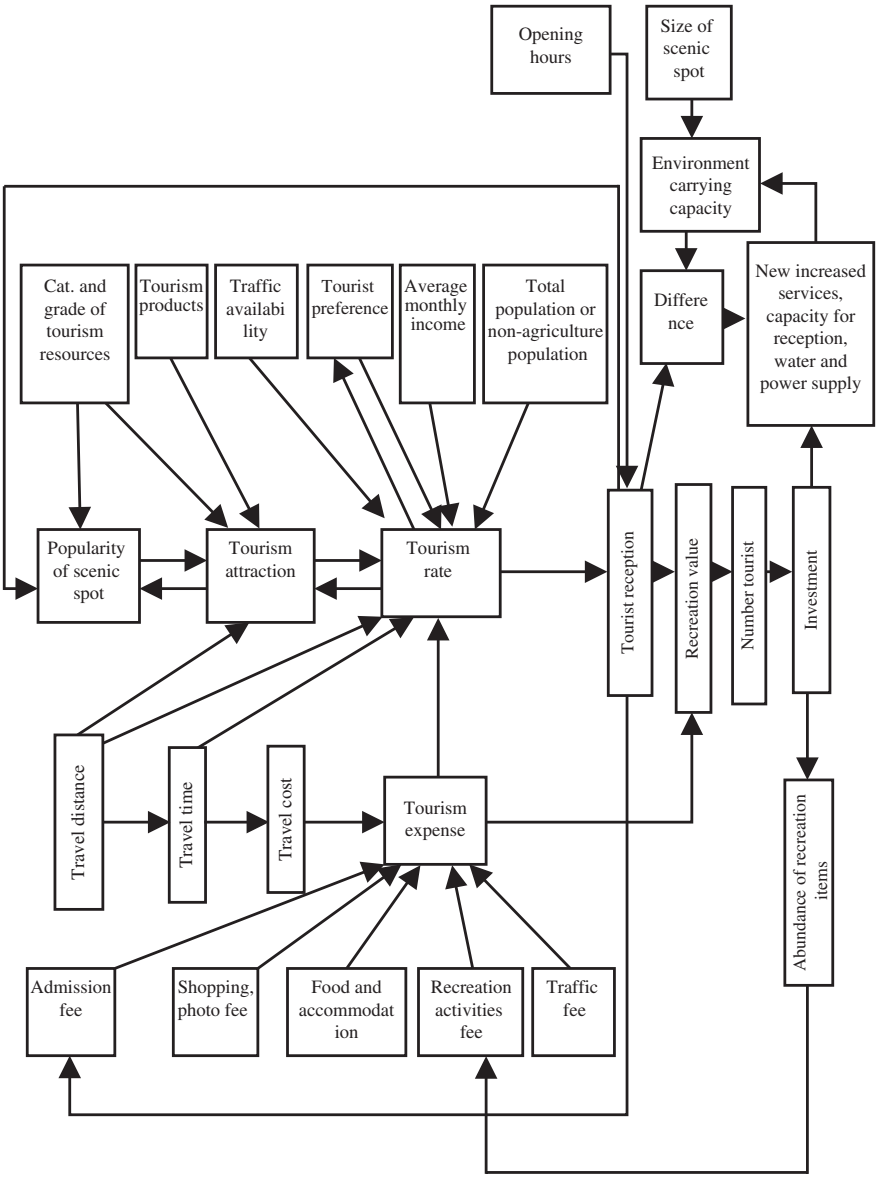

Fig. 1 Causality diagram for influence factors of recreation values of desert scenic spot

Average Monthly Income or Per Capita Disposable Income

The recreation demand of tourist source depends on the urban residents' disposable income and population above certain income (Wu 1999). The travel rate of

tourist source presents a positive correlation with the local social and economic development level, especially the per capita disposable income; the per capita travel expenses also presents a positive correlation with resident income of tourist source; namely the higher resident income can guarantee the more per capita tourism expense. The increase of the per capita disposable income lays an economic basis for development of desert tourism.

Travel Distance and Traffic Availability

Travel distance can be classified into absolute distance and relative distance. The urban residents' travel distance shows a strong correlation with urban size. Travel rate of the province with near space distance to the scenic spot is higher than that of the province with far space distance. For the same traffic vehicle, the greater the travel distance is, the higher traffic cost will be; the longer the travel time is needed, the greater the time cost will be; and the larger the travel expenses is, the lower the travel rate will be. In the foreign calculation of transportation cost, the distance is determined through jurisdiction region of the self-driving license plate and then traffic cost can be converted according to the unified criteria; for example, the criteria adopted by the United States Department of Transportation (DOT) and the American Automobile Association (AAA) is $0.12/miles. Since the self-driving travel is still not popularized in China, there is a great difference in the traffic cost due to the different vehicle and comfortable degree selected. If the actual traffic cost of each specimen get to the destination scenic spot is directly taken as the travel cost, it may appear travel cost of tourists with near distance is high, travel cost of tourists with far distance is low (Zhao et al. 2009). Therefore, it is preferential to express the traffic cost from same tourist source to the scenic spot as same vehicle cost during the original data sorting.

Traffic availability is not only determined by space distance, but also impacted by traffic mode and route, and station distribution. Traffic availability ⇔ travel rate forms a positive feedback loop. The better the traffic availability is, the greater the travel rate will be; and the larger the travel rate is, the more tourists will be. The poor road conditions and traffic inconvenience will force the local government attach great importance to construct the external infrastructure for the scenic spot, increase traffic volume, improve road conditions, and widen the roadside, and then the traffic availability can be improved. Since many desert scenic spots are located in the margin of the northwest oasis, a large gap is still existed for traffic availability, so it is taken on phenomenon of "available arrival and difficult return," "a ticket of sleeping berth is hard to obtain," or even "a ticket of hard seat is hard to obtain" in the tourist season. As the train tickets online booking system is implemented recently, it greatly limits the individual traveler to visit many destinations at once tour.

Popularity—The popularity is a degree of being understood and known by the public. The popularity of desert scenic spot ⇔ tourism attraction forms a positive feedback loop. The greater popularity of the scenic spot is, the larger tourism attraction will be; and vice versa. "Popularity → tourism attraction → travel

rate → tourist reception → popularity" forms a positive feedback loop, the greater popularity of the scenic spot is, the larger tourism attraction will be, the higher travel rate is, and the greater tourist reception will be, popularity of the scenic spot can be further promoted and expanded through publicity of the tourists. This positive feedback loop can explain that popularity of the desert scenic spot is of importance to improve the travel rate, expand the tourist reception. For example, Shapotou is famous around the world for its achievement of desertification control, enjoying various titles, such as the "Top Five Beautiful Deserts in China," "Global Top 500 Environmental Protection Unit," "Top Twenty Famous Landscape for National Fitness in China," "Top Ten Most Interesting Spots in China," and so on. In 2011, the tourist reception of Shapotou scenic spot reached 900,000 person-time, and tourism income was RMB 60.18 million. The tourist reception of the famous Inner Mongolia Xiangshawan scenic spot reached 1.012 million person-time, and business revenue amounted to RMB 112.7583 million.

3.1.2 Internal Influence Factors of Recreation System Function

Attraction of the recreation spot is an interaction force between tourist source and recreation spot, it is rooted from popularity, features and quality of recreation spot, the tourists' familiarity to the destination.

Size of Desert Scenic Spot

Although a few of desert scenic spots are lesser, for example, Gansu Yueya Spring is only 0.9 hm^2, many desert scenic spots are much large relative to the urban parks, scenery areas, for example, area of Shapotou in Ningxia is 13,000 hm^2, area of Ala Shan Desert World Geological Park is 63,037 hm^2, and area of Xiangshawan in Inner Mongolia reaches to 1,600,000 hm^2. The larger the area is, the smaller the resistance from distance is, and the greater the moment capacity and spatial capacity will be. Due to influences of objective conditions, such as climate, topography, transportation, water supply conditions, and traffic conditions, the services and reception facilities of desert scenic spot are mainly planned and designed in the desert recreation area permitted open. The activities of both team tourist and the self-driving tourist are limited in the area within a distance of 20 km to the edge of desert, only a few scenic spots have specifically designed the desert crossing program, entering into the desert hinterland areas within 250 km in view of differentiation management.

Category and Grade of Desert Tourism Resource

Tourism resource is the most important factor of which tourist destination can attract tourists, but also one of essential conditions to ensure the successful

tourism development. Desert tourism resources can be divided into 8 major categories, 22 subgroups, and 80 basic types with various characteristics, such as regional features, uniqueness, scientific and knowledge, the long-term and nonrenewable formation, morphological diversity, and functional diversity. Natural tourism resource is a foundation of tourism development of desert scenic spot, and the culture tourism resource makes tourism activities become a really high level of mental activity.

For the desert scenic spot, the more tourism resource types have, and the higher its grade is, and the greater the attraction to tourists will be. For example, Shapotou is located in the southeastern margin of Tengger Desert integrated the desert, Yellow River, the mountain and oasis, it is featured as both spectacular northwest scenery and the beauty scenery at south of Yangtze River, unique natural landscape and abundant cultural landscape, so it is honored as a monopoly tourism resources in the world by experts of tourism circle.

Dune is an aggregate of sand under action of wind, is major landform types of desert or sand (Li and Ni 2000). Due to the different wind regime, dune shapes through accumulation of sand are also different. Among the conditions of desert tourism resources, the dune shape plays a key role in influencing development of desert tourism, and size of desert zone has no obvious effect on tourism development (Wang and Hu 2010). Both Yinken Xiangshawan and Shapotou are crescent hill chain or grating hill landform with rare and wonderful singing sand landscape, diversity of dune shape provides an innate advantage for the different scenic spots to develop recreation activities, such as desert experiences, adventure and expedition, so as closely contact with the mysterious desert.

Abundance of Tourism Products

Tourism products shall be based on the types and characteristics of tourism resources, all kinds of programs or activities shall be developed and designed in view of the attributes and preference of target market, which is aimed to attracting tourists to participate in, satisfying tourists' demands and expanding the tourism income. Tourism products can be divided into a sightseeing tour type, experience type, expedition and exploration type, leisure entertainment type, and vocation type. Desert tourism products cover five types. Many people expressed on Chinese tourism areas: "more sights, less plays, and less thing worthy of meditation and pleasures," however, the experienced, participated, and challenging desert tourism products make up for deficiency of other tourism activities, which let visitors "see enough and enjoy oneself."

At present, the experienced products developed in desert scenic spot mainly include desert surfing, sliding sand, paraglider, bungee jumping, karts, horse riding, riding camels, sand bath, etc., the scenic spots with rivers and lakes distributed can be developed some experience activities, such as slip line, swimming, rowing, boating, and drifting. In order to attract participation of different tourists, the above single experience activity (such as desert surfing, and riding a camel) is

classified into the short, middle, and long line in some scenic spots; some scenic spots bundle several activities together as a combination, such as surfing + horseback riding, surfing + riding + bungee jumping, surfing long line + horse riding + camel riding, selling package with a certain range of discount (RMB 20 ~ 50).

The exploration products developed in desert scenic spot mainly cover hiking, camel riding, motorcycle riding, or self-driving across the desert, etc. At present, the hiking across desert is still in a spontaneous state organized by the tourist friends with higher glamor index, but extremely challenging and risk. Ningxia Shapotou and Inner Mongolia Tonghu tourism area develop the camel riding across Tengger Desert with linear distance of 8.3 km, time needed 4 ~ 5 h, and price of RMB 500/person. This kind of short and midway organized across the desert and expedition may become the future development direction of desert tourism exploration.

The entertainment products developed in desert scenic spot mainly cover such activities as national song and dance, campfire party, all kinds of cultural art festival. For example, Yinken Xiangshawan has planned the first-class specific activities with depth experience in China, such as "Erdos Wedding" performed by Mongolian Art Troupe, the original campfire culture performance and Yurt Sacrifice of Meeting at the Yurt. Similarly, since 2009, Shapotou began to performing "Camel Bell Sounds" with live-action in the tourism area, hold a mirage bonfire party every day, and regularly held the Super Pickup Challenger.

Tourist Reception

Tourist reception depends on some factors of desert scenic spot, such as open time, travel rate, tourism expenses, and tourism carrying capacity.

Travel rate is a percentage of the tourists of which a destination or scenic spot receipted from certain region accounting for total population in the region, generally calculated by means of questionnaire. It is shown from Fig. 1 that travel rate is comprehensively influenced by various factors, including population of tourist source, tourism attraction, tourist preference, tourist attributes, travel distance, travel time, and travel cost. Travel preference ⇔ travel rate, tourism attraction ⇔ travel rate all form the positive feedback loops, namely the larger travel preference is, the higher tourism rate will be; and vice versa. The greater tourism attraction is, the higher travel rate will be; and vice versa. The average monthly income and the travel rate present a positive correlation, the higher the income level is, the greater travel rate will be, and vice versa. Travel expense has significant or extremely significant negative correlation with travel rate; namely, the larger travel expenses is, the lower travel rate will be. Travel time and travel rate present a negative influence correlation; the longer travel time is needed, the lower travel rate will be; but it is necessary to test through the statistical hypothesis whether travel time has a significant effect to the travel rate or not.

Desert carrying capacity refers to maximum number of tourists held by the desert scenic spot without affecting tourists' experiences; it depends on not only the space and ecological capacity of the desert scenic spot, but also the economic capacity, and mental capacity of tourists and local residents. The appropriate carrying capacity of the desert scenic spot shall be determined according to the "Cannikin Law." Assumed that capacity of a desert scenic spot is known, when the visitor reception is no more than the environmental carrying capacity, the scenic spot shall focus on the resources development, target market orientation, and product innovation, expand popularity of the scenic spot through the appropriate marketing strategy, try to attract tourists, and increase the tourist reception. It is shown from Fig. 2 that tourist reception → recreation value → tourism income → investment → new services, capacity of reception, water and power supply → environmental carrying capacity → tourist reception form a positive feedback loop. With the increasing tourist reception, tourism income will increase accordingly, the enterprise can invest more capital to expand service, capacity of reception, water and power supply, the environmental carrying capacity will be accordingly expanded, and tourist reception will be further expanded.

When tourist reception is more than the environmental carrying capacity, the bigger the difference between them is, the more serious the possible environmental and social negative impact may cause, the greater the investment required, the higher the new tourism services, capacity of reception, water and power supply will be, and then the greater the environmental carrying capacity can be obtained, which causes such difference less. (Tourist reception and environmental carrying capacity) difference → investment → service, capacity of reception, water and power supply → environmental carrying capacity → such difference form a negative feedback loop, which limits infinitely expansion of the investment and environmental carrying capacity; while tourist reception → such difference investment → -new services, capacity of reception, water and power supply → environmental carrying capacity → tourist reception form a positive feedback loop. The expansion of tourist reception brings the increased investment, enlarges the carrying capacity of desert scenic spot, and accordingly further expands the tourist reception.

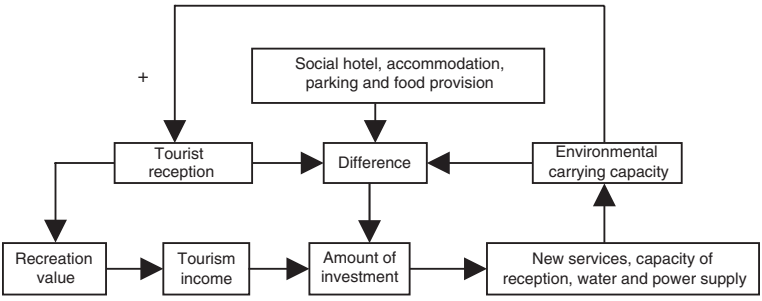

Fig. 2 Relationship diagram between tourism reception and environmental carrying capacity

Environmental carrying capacity is a relatively stable value in a certain period of time. With the increasing number of tourists and investment, it will become a variable and always keep a dynamic balance. Analyzed from the composition of environmental carrying capacity (spatial, ecological, economic, and mental capacity), the water supply capacity is the first key restriction to the tourist reception, secondly followed by the traffic availability from the tourism destination to scenic spot, reception capacity of the hotel, catering, size of the scenic spot, the ecological capacity, parking lot, and reception capacity of toilets; with strengthening the environmental hygiene management, the secondary factors are not the restrictive preconditions of the tourist reception.

Tourism Expense

Travel costs represent average cost of each tourist of tourist source each for one tour. Leisure time value is calculated according to 1/3 of the daily wage. Travel expense → recreation value → tourism income → investment → recreation project → recreation activity cost → travel expense form a positive feedback loop. The larger per capita travel expense is, the larger recreation value of the scenic spot will be, the greater tourism income can make, the more fund can be used for recreation project development, the greater the recreation projects can become, and then the more expenses of tourists used in the experience program (Fig. 1). Travel expense → travel rate → tourists reception → tickets cost—travel expense form a negative feedback loop. Travel expense and travel rate present a negative correlation; the larger travel expense is, accordingly the lower travel rate will be, the less tourist reception is, and the lower ticket income also is. That is, when amount of tourist is larger; the operator tends to raise the ticket price on the excuse of restricting passenger flow for "the ecological environment protection," presently the tourism industry falls into a strange circle of "a rise every 3 years." Ticket price can raise 20 %, or even 60 % every time, and accordingly the tourist expense is increased, which leads to travel rate and tourist reception decline in a short period.

Desert tourism can be considered as a tourism form integrated sightseeing tourism, ecological tourism and sports tourism, special tourism. Desert adventure and expedition are the concrete manifestation of ecological tourism. Compared with other tourism forms, cost for recreation activity in desert tourism accounts for a large proportion of tourism expense. For example of Ningxia Shapotou tourism area, assumed a tour from Beijing to Zhongwei City needs 4 days totally, lodging 3 nights, and only one scenic spots is traveled, the per capita tourism expense is RMB 3595 ~ 3915. Among of them, each expenditure is sorted by amount in turn: recreation activities (RMB 945 ~ 1265/person), time cost (RMB 870/person), accommodation (RMB 600/person), transportation (RMB 590/person), meals (RMB 400/person), tourism shopping (RMB100/person), and ticket fee (RMB 90/person). Of course, tourists from thousand miles away can not only travel one scenic spot, generally may visit other attractions by the way. For example, tourist

from Beijing to Zhongwei City may visit Gaomiao Park in the Zhongwei and Inner Mongolia Tonghu Tourism Area. After such expense is allocated into transportation, accommodation, meals, tourism shopping, and time cost of whole trip from Beijing to Zhongwei according to the ticket fee or tourism time, cost for recreation activities accounts for a large proportion of per capita expense in the tour of Shapotou.

Analyzed on the composition of recreation activities at Shapotou, the biggest expense for riding camel cross the desert from Shapotou to Tonghu is (RMB 500/person), secondly followed by bungee (RMB 160/person), hang gliding (RMB 100/person), strop ropeway (RMB 80/person), desert surfing (RMB 80/person, short route), kart (RMB 40/person), horse riding (RMB 40/person), camel riding (RMB 40/person), sliding sand (RMB 30/person), sliding sand cableway (RMB30/person), desert escalator (RMB 20/person), and battery truck (RMB 5/person). The proportion of tourism expense, especially expense for recreation activities has very large influence on the recreation value of desert scenic spot, and the role of ticket price is very small, which indicates that the desert scenic spot similar to Shapotou has been completed transformation from the original sightseeing tourism to experience tourism, special tourism and sports tourism, the "tickets economy" has been substituted by the "experience economy and low carbon economy." Desert scenic spot has been transformed from the initial irritating programs with less entertainment, such as sliding sand, horse riding, and camels riding, to middle-end program, such as cableway across the Yellow River, bungee and desert karts, and further derived some high-end programs, such as across the desert, the round-trip of oasis (RMB 50/person), round-trip desert adventure (RMB 150/person), and the desert sunset (RMB 80/person), which is also in line with the direction of modern tourism.

3.2 Evaluation on Importance of the Influence Factors of Recreation Value of Desert Scenic Spot

Twelve factors are selected from the internal and external factors of recreation value of desert scenic spot, and 20 experts are invited to sort their importance order (Yu 1996), the survey data are analyzed by computer with results in Table 1. Among all influence factors of recreation value of desert scenic spot, the abundance of tourism products is most important, ranking the first, which has an important effect on tourist's experience. The more the variety and quantity of tourism products have, the more scope tourist can choose and the stronger enthusiasm participation experience will be. Recreation endowment of resources relates to popularity of the scenic spot; the higher level of resource promises the greater popularity and tourist reception. Therefore, recreation endowment of resources is ranked as the second place according to its importance. The average expense

Table 1 Integrated weight of influence factors of recreation values

No.	Factor	Factor	Weight	Integrated weight	Rank
1	External factor (0.3333)	Geographical position of scenic spot	0.2267	0.0755	9
2		Population size of tourist source	0.1333	0.0444	11
3		Traffic convenience	0.2533	0.0844	6
4		Regional per capita income	0.1067	0.0356	12
5		Popularity of scenic spot	0.2800	0.0933	4
6	Internal factor (0.6667)	Size of desert scenic spot (area, etc.)	0.1143	0.0762	8
7		Recreation resources endowment (type, grade)	0.1786	0.1191	2
8		Abundance of tourism products	0.2071	0.1381	1
9		Visitors reception	0.1214	0.0810	7
10		Average tourist expense of in scenic spot	0.1571	0.1048	3
11		Environmental carrying capacity	0.1357	0.0905	5
12		Tourism income	0.0857	0.0571	10

corresponds to the product abundance in the scenic spot, ranking the third place. The recreational products of desert scenic spot have been transformed from sightseeing type to the entertainment experience, exploration, and expedition, therefore, desert recreation activity is featured as adventure and high consumption. Tourist reception is also of great importance, ranking the seventh. According to its importance, the environmental carrying capacity is ranked the fifth, following the popularity. Size of desert scenic spot is ranked as the eighth with less impact to the tourism development. Other factors, such as the geographical location, tourism income, population of tourist source, regional per capita income, have weak effect on the recreation value.

During comparison between this research results and the research on the national park by Tang et al. (2010), an interesting phenomenon is appeared that the importance order of each factor established by Tang et al. (2010) is just opposite to that in this paper. For National Park, protection function is the most important, followed by the recreational function, scientific research function, and education function, while the unique characteristics of desert tourism is based on the special natural geography environment and humanistic environment of arid area as a carrier, paying more attention to enjoyment and recreation of tourism activities (Pan 2000). Therefore, among the influence factor of recreation value of desert tourism, products abundance, the level, status, and role of resource are very important (Table 2).

Table 2 Comparison of importance order of influence factors

Importance order	Recreation value of desert scenic spot	Recreation function of National Park ([18])
Abundance of tourism products	1	7
Level of recreation resource	2	4
Environmental carrying capacity	5	6
Traffic availability	6	3
Tourist number	7	2

4 Conclusions

Abundance of tourism products is one of the most important factors among external and internal factors. The ecological environment of scenic spot of desert is very vulnerable; recreation experience of tourists plays an important role in its functions. So among the influence factor of recreation value of desert tourism, products abundance, the level, status, and role of resource are very important.

Compared with other tourism forms, cost for recreation activity in desert tourism accounts for a large proportion of tourism expense. The price of ticket of scenic spot accounts for a very small proportion of tourism expense. Many scenic spots of desert have been completed transformation from the original sightseeing tourism to experience tourism, special tourism and sports tourism, the "tickets economy" has been substituted by the "experience economy and low carbon economy."

According to its importance, the environmental carrying capacity is ranked the fifth and it has very small impact to the tourism development.

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