

ORIGINAL ARTICLE

Evaluation of the Non-use Values of Taishan Mountain Cultural Heritage

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Abstract

The contingent valuation method (CVM) is one of the most commonly used and effective methods to evaluate non-use value of resources. Reasonable application of CVM to value the cultural heritage is the key process of evaluation. CVM was used to evaluate the non-use value of cultural heritage of Taishan Mountain combined with questionnaire survey and field research in this study. The results indicated that the importance of the degree of the three components of non-use value was heritage value ranked highest (40.22%) > followed by existence value (38.58%) > then option value (21.20%). In addition, the rate of willingness to pay was 54.52%, the average and median values of per person were 40.17 CNY·a⁻¹ and 20.00 CNY·a⁻¹ and the non-use values of Taishan Mountain cultural heritage was 33 million CNY·a⁻¹. The median value of WTP was consistent with Asian countries but was lower than European and American countries. Factors influencing WTP showed that monthly income and satisfaction with Taishan Mountain were correlated to WTP, and family location and willingness to revisit were correlated remarkably with WTP. In addition, monthly income was correlated remarkably with WTP value, however other factors were not. The results showed the importance and necessity of protective development of Taishan Mountain cultural heritage, which would be used as an important reference for decision makers.

Key words : Cultural heritage, Non-use values, Contingent valuation method, Taishan Mountain

1. Introduction

Cultural heritage refers to material facilities that embody the achievements of spiritual civilization construction in a specific period, as well as the supporting social system form and ideological foundation (Yu, 2004). It includes not only individual heritage types such as monuments, buildings and sites, but also large-scale cultural landscape types such as urban historical buildings, cultural routes and industrial heritage that are inseparable from the

surrounding environment (Cui and Lin, 2010). Due to the richness and complexity of cultural heritage resources, people usually do not have a direct and comprehensive understanding of cultural heritage resources. At present, value analyses of cultural heritage resources are mostly limited to qualitative analysis and fuzzy analysis. Scholars at home and abroad have gradually applied the Contingent Valuation Method (CVM) to evaluate different types of cultural heritage, with a view to providing a basis for decision-making by government management

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departments (John et al., 2009; Chen and Hua, 2015; Kimura et al., 2021).

CVM also known as the willingness survey valuation method, is most widely used in evaluation on the value of public goods in ecological economics and environmental economics worldwide in recent years. It reveals the maximum willingness to pay (WTP) for environmental improvement or the minimum willingness to accept (WTA) for environmental degradation by building a hypothetical market. In other words, CVM is to guide respondents to speak out how much they are willing to pay or receive for compensation in the simulated market. Davis(1963) applied CVM for the first time to study the recreational value of a woodland in Maine. Since then, this method has been continuously used to evaluate the benefits of various public goods and related policies (Lo and Jim, 2015; Liu and Chuang, 2022). China introduced the basic concept of CVM in the 1980s. It has been applied to evaluation of water quality, air quality, biodiversity and ecosystem, tourism resources and non-use value of urban green space. And then the research on the non-use value of cultural heritage, industrial heritage, and agricultural heritage is gradually becoming a hotspot (Chen and Hua, 2015; Fu, 2019; Chu et al., 2020). This study took cultural heritage resources of Taishan Mountain as an example, evaluated its non-use value and analyzed the influencing factors, in order to provide a scientific basis for the protection of Taishan Mountain cultural heritage.

2. Research site and Methods

2.1. Research site and survey process

Taishan Mountain (116°02'~117°59'E, 35°38'~36°28' N), located in the central part of Shandong Province, is subordinate to Tai'an City. It covers an area of about 426 km², and the main peak is 1532.7 m above sea level. It is formed by the integration of natural and cultural landscapes. In 1987, it was listed as the world natural and cultural heritage by UNESCO. The World Heritage Committee commented on the

landscape of Taishan Mountain that the solemn and sacred Taishan Mountain has been the object of imperial worship for 2000 years, and its cultural masterpieces and natural landscapes are perfectly and harmoniously integrated. Taishan Mountain has always been the spiritual source of Chinese artists and scholars, and the symbol of ancient Chinese civilization and belief.

The study on the non-use value of Taishan Mountain cultural heritage resources adopted CVM method, combined with questionnaire and on-site visit. The survey process was divided into three stages. Firstly, pre-survey stage. From January to March 2019, expert consultation was conducted first. The experts covered the fields of tourism, landscape architecture, urban planning, environmental science and literature. WTP adopted an open guidance method and revised the questionnaire after sorting out the feedback. Secondly, a small-scale survey was conducted in various scenic spots of Taishan Mountain from March to April 2019. According to the feedback from the pre survey, WTP adopted the payment card guidance method to mainly test the starting point value of bidding and the range of value interval (Xu et al., 2020). Lastly, the formal investigation was conducted in April to June 2019 at Dai Temple, Red Gate Palace, Midway Gate to Heaven, Southern Heavenly Gate, Jade Emperor Peak and Heaven and Earth Square. The investigation process was divided into two groups (two sophomores and three seniors as a group). The investigation time considered the working days, the end of the week and the May Day holiday.

The questionnaire included five parts. (1) Introduction of Taishan Mountain cultural heritage and non-use value, supplemented by relevant photos in different periods. (2) Respondents' understanding of Taishan Mountain cultural heritage. (3) The survey of respondents' willingness to pay adopted the payment card method, and the core valuation was 1, 5, 10, 20, 30, 50, 100, 200 CNY and other amounts in turn. (4) According to the social and economic characteristics of the respondents, such as gender, age, occupation, monthly income, home location, etc. (5) Suggestions



Fig. 1. The survey process.

on the protection of Taishan Mountain cultural heritage and the understanding of the questionnaire were consulted.

2.2. Data analysis

The results were classified and sorted out, and a database was established. Nonparametric test was used to judge the distribution of data. Data were analyzed by SPSS through statistical description analysis and Chi-square test.

3. Results and Discussion

3.1. Analysis of respondents' cultural heritage awareness and WTP

In this study, 800 questionnaires were distributed, 720 recovered, 664 valid, 56 invalid. Results showed that 362 respondents were willing to pay, 302 not, and the rates of willingness and unwillingness to pay were 54.52%, and 45.48% respectively. The rate of willingness to pay was slightly lower than that in other cultural heritage studies. For example, in Dunhuang's (Guo and Wang, 2005) and Leshan Giant Buddha's (Xiong et al., 2007) surveys, the value was 67.62% and 68.84% respectively. Tuan's (2008) survey on the My Son World Heritage in Vietnam showed that the rate of willingness to pay of foreign tourists and domestic tourists were 51.00% and 42.40% respectively.

The respondents' supports for the heritage value, existence value and option value were 40.22%, 38.58% and 21.20% respectively. It showed that heritage value was the most important, followed by existence value and option value, which indicated

that people had a high degree of recognition for cultural heritage resources of Taishan Mountain. In other words, 40.22% of the respondents hoped to leave Taishan Mountain cultural resources to future generations, 38.58% hoped that Taishan Mountain unique cultural resources could always exist, and 21.20% hoped that Taishan Mountain become a choice for future visits. The results showed that 15.4% of the respondents understood the value of Taishan Mountain cultural heritage very well, 72.3% generally understood it, and 12.3% did not. And 82.3% of the respondents thought that the cultural heritage value was very important, 15.4% thought it general, and 2.3% thought no-important. And 30.3% of the respondents were satisfied with the protection status of Taishan Mountain cultural heritage, 59.7% were generally satisfied and 10.0% were not. These showed that the general public had realized the importance of the value of cultural heritage, but they still lack practical care and understanding of the situation and problems of cultural heritage value. In addition, many tourists reported the following problems, such as the protection of ancient buildings and inscriptions, the management of Taishan Mountain incense, cultural souvenirs characterised by Taishan Mountain, the collation of legend materials, the inheritance and development of Taishan Mountain culture, the protection and restoration of natural and cultural landscapes.

3.2. Analysis of WTP

Proper WTP guidance mode is very important to get the real WTP value. The existing guidance modes mainly include bidding game method, open type, payment card, dichotomy, and each method has its

Table 1. The frequency distribution of the accumulating WTP value

WTP value/ CNY	Effective frequency/ %	Cumulative frequency/ %	WTP value/ CNY	Effective frequency/ %	Cumulative frequency/ %
1	12.0	12.0	30	12.0	67.2
5	12.0	24.0	50	8.2	75.4
10	18.1	42.1	100	21.9	97.3
20	13.1	55.2	200	2.7	100.0

Table 2. Comparison of guidance modes and WTP value between this research and other researchs

Author/ time	Example of case	Guidance modes	WTP value
Kim et al. (2007)	Changdeok Palace	Dichotomous choice	The mean WTP values were 5706Won (\$5.70) in a log-linear model and 6005 Won (\$6.00) in a log-logit model.
Tuan and Navrud (2008)	My Son World Heritage site (WHS) in Vietnam	Payment card	The mean WTP estimates were \$8.78 and \$2.27 for foreign visitors and Vietnamese visitors respectively.
Lee (2015)	Intangible Cultural Heritage Hall in Jeonju, Korea	Single bounded dichotomous choice (SBDC)	The mean WTP for Jeonlabuk-do and other regions were estimated to be 4979.4 Korean won (USD 4.53) and 5411 Korean won (USD 4.92), respectively.
Kimura et al. (2021)	Bayon Temple in Cambodia	Payment card	The mean value for cases involving at least five photos was 0.927 US\$, whereas the mean value for cases involving at least 10 photos was 1.328 US\$.
Liu and Chuang (2022)	Qiedong-Wang-Gong (Bischofia javanica) (QWG)	Payment card	The WTP mean predicted by the ordered Probit model and the Tobit model was underestimated by approximately NT\$50-60. The WTP mean predicted by the OLS: Log(WTP+1) and Tobit: Log(WTP+1) was underestimated by NT\$90-100.

advantages and disadvantages. Many scholars have also discussed this. This study selected the payment card mode according to the research purpose, the feedback of pre-survey results and the verification of small-scale survey. The payment card with questionnaire method directly displayed the respondents' maximum willingness to pay, so as to analyze the average value and median value.

As shown in Table 1, the highest bidding frequency was 100 CNY, followed by 10 CNY. The frequencies of 1, 5, 20 and 30 CNY were similar, and the frequencies of 50 CNY and 200 CNY were the lowest. The bid amount was relatively concentrated on the integer currency value common in the currency circulation of 10, 20 and 100 CNY, which

was consistent with the public's daily payment psychology. So the average and median values were 40.17 CNY·a⁻¹ and 20.00 CNY·a⁻¹ respectively. Referring to relevant studies at home and abroad, the willingness to pay varied in different types of cultural heritage in different regions (Table 2). Among them, Asian countries usually had a lower value, while European and American countries had a higher value, which was related to the types of cultural heritage, popularity, tourist sources and local living standards. The median value of WTP was consistent with Asian countries but was lower than European and American countries.

Due to the large difference in WTP values among respondents, it was easy to cause errors when

Table 3. Correlation between WTP and social characteristics of respondents

Factors	X^2	Degrees of freedom	Significance	Correlations
Gender	0.005	1	0.944	No correlation
Age	1.417	3	0.702	No correlation
Occupation	5.006	5	0.415	No correlation
Monthly income	13.759	5	0.017*	Significant correlation
Family location	22.743	3	0.000**	Highly significant correlation
Understanding of Taishan Mountain	10.427	2	0.005	Weak correlation
Satisfaction with Taishan Mountain	11.142	2	0.004*	Significant correlation
Revisit to Taishan Mountain	17.462	2	0.000**	Highly significant correlation

*P<0.05 , **P<0.01

Table 4. Correlation between WTP value and social characteristics of respondents

Factors	X^2	Degrees of freedom	Significance	Correlations
Gender	8.906	7	0.259	No correlation
Age	23.168	21	0.335	No correlation
Occupation	47.417	35	0.185	No correlation
Monthly income	70.305	35	0.000**	Highly significant corre
Family location	19.948	21	0.525	No correlation
Understanding of Taishan Mountain	16.794	21	0.724	No correlation
Satisfaction with Taishan Mountain	14.993	14	0.379	No correlation
Revisit to Taishan Mountain	7.521	14	0.913	No correlation

*P<0.05 , **P<0.01

calculating TWTP (total willingness to pay) with average value, while the median value was relatively unaffected by extreme values in the statistical data. Therefore, the median value was often used to calculate TWTP instead of the average value. Based on this, the non-use value was obtained.

$$\text{TWTP} = 0.03 \times 108 \times 54.52\% \times 20.00 = 0.33 \times 10^8 \text{ CNY} \cdot \text{a}^{-1}.$$

This was quite different from the total value of Dunhuang (12 million CNY) and Leshan Giant Buddha (46 million CNY), which was related to the average value and the actual number of people who was to pay.

3.3. Correlation analysis of respondents' social characteristics, WTP and WTP value

The social characteristics of the respondents

included gender, age, occupation, monthly income, family location, understanding of Taishan Mountain, satisfaction with Taishan Mountain and whether to revisit. These eight factors were determined based on similar studies and pre-surveys. Analysis of X^2 between respondents' social characteristics and willingness to pay showed that there was a certain correlation between them (Table 3). The most significant factors were the respondents' home location and revisit. The significant factors were the respondents' monthly income and their satisfaction with Taishan Mountain. Gender, age and occupation of the respondents had no significant effects on the WTP.

Further analysis showed that the social characteristics of the respondents also had a certain impact on the WTP value (Table 4). Monthly income had a very significant impact on the WTP value,

while gender, age, occupation, family location, understanding of Taishan Mountain, satisfaction and revisit had no significant impact. However, statistics showed that the higher the monthly income, the closer the family was to Taishan Mountain, and the more they knew about Taishan Mountain, the higher WTP value.

4. Conclusion

The value evaluation of cultural heritage resources has certain particularity compared with the value evaluation of natural resources, which is mainly reflected in three aspects. Firstly, the cognition of public was relatively low because of the richness and complexity of the content of cultural heritage resources. Secondly, it was difficult for the public to choose because of the influence of values on the cognition of cultural heritage value. Thirdly, the benefits brought by cultural heritage were intangible, cultural, spiritual, and difficult to feel. So this study conducted corresponding treatment during the investigation. Firstly, pictures and words were used to explain the non-use value of Taishan Mountain cultural heritage, so that the respondents could clearly understand the purpose and significance of the study. Secondly, the interviewees were selected in mountaineering tourists and local residents at scenic spots with concentrated cultural landscape. Thirdly, the questions were designed in a step-by-step way, which was easy for people to accept.

About 82.3% of the respondents thought that the value of Taishan Mountain cultural heritage was very important, but only 15.4% knew it well. And only 30.3% were satisfied with the protection of Taishan Mountain cultural heritage. Among the three components of the non-use value of Taishan Mountain cultural heritage, the respondents believed that the order of importance was heritage value > existence value > option value. The respondents' willingness to pay for the protection was 54.52%, the average and median values of willingness to pay were 40.17 CNY·a⁻¹ and 20.00 CNY·a⁻¹ respectively, and the non-use value was 0.33×10^8 CNY·a⁻¹. The

respondents' monthly income and satisfaction had a significant impact on their willingness to pay, and the location of their family and revisit had a very significant impact on their willingness to pay. Monthly income had a very significant impact on WTP value, and other factors had no significant impact. These showed the importance and necessity of protective development of Taishan Mountain cultural heritage, which would be used as an important reference for decision makers.

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REFERENCES

- Chen, W. Y., Hua, J., 2015, Citizens' distrust of government and their protest responses in a contingent valuation study of urban heritage trees in Guangzhou, China, *Journal of Environmental Management*, 155, 40-48.
- Chu, X., Zhan, J., Wang, C., Hameeda, S., Wang, X., 2020, Households' willingness to accept improved ecosystem services and influencing factors: Application of contingent valuation method in Bashang Plateau, Hebei Province, China, *Journal of Environmental Management*, 255, 109925.
- Cui, W. H., Lin, F. F., 2010, Assessing the value of cultural heritage resources: Limitations and improvements of the contingent valuation method, *Resource Science*, 32, 1993-1998.
- Davis, R. K., 1963, Recreation planning as an economic problem, *Natural Resources Journal*, 3, 239-249.
- Fu, X. E., 2019, Assessment of social utility of green infrastructure based on the contingent valuation method: taking Suzhou Jinji Lake Scenic Area as an example, *Chinese Landscape Architecture*, 35, 46-50.
- Guo, J. Y., Wang, N. A., 2005, Evaluation of the non-use values of tourist resources of Dunhuang, *Resources Science*, 27, 187-192.
- John, B. L., Catherine, M. K., 2009, Mountain substitutability

- and peak load pricing of high alpine peaks as a management tool to reduce environmental damage: A contingent valuation method, *Journal of Environmental Management*, 90, 1751-1760.
- Kim, S. S., Kevin, K. F., Cho, M., 2007, Assessing the economic value of a world heritage site and willingness-to-pay determinants: A case of Changdeok Palace, *Tourism Management*, 28, 317-322.
- Kimura, F., Ito, Y., Matsui, T., Shishido H., Kitahara, I., Kawamura, Y., Morishima A., 2021, Tourist participation in the preservation of world heritage - A study at Bayon Temple in Cambodia, *Journal of Cultural Heritage*, 50, 163-170.
- Lee, J. S., 2015, Measuring the benefits of the Intangible Cultural Heritage Hall in Jeonju Korea: Results of a contingent valuation survey, *Journal of Cultural Heritage*, 16, 236-238.
- Liu, W. Y., Chuang, Y. C., 2022, To exclude or not to exclude? The effect of protest responses on the economic value of an iconic urban heritage tree, *Urban Forestry & Urban Greening*, 71, 127551.
- Lo, A.Y., Jim, C. Y., 2015, Protest response and willingness to pay for culturally significant urban trees: implications for contingent valuation method, *Ecological Economics*, 14, 58-66.
- Tuan, T. H., Navrud, S., 2008, Capturing the benefits of preserving cultural heritage, *Journal of Cultural Heritage*, 9, 326-337.
- Xiong, M. J., Guo, J. Y., Deng, D., 2007, Evaluation of non-use value of tourism resources by CVM: a case study of Leshan Giant Buddha, *Journal of the Party School of Leshan Municipal Committee of C.P.C*, 9, 76-78.
- Xu, F., Wang, Y., Xiang, N., Tian, J., Chen, L., 2020, Uncovering the willingness-to-pay for urban green space conservation: A survey of the capital area in China, *Resources, Conservation & Recycling*, 162, 105053.
- Yu, J. Y., 2004, *A Handbook of the world cultural and natural heritage*, Shanghai Scientific and Technological Literature Press, 3.
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