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Economic Benefits of Improving the Quality of Cultural Heritage Sites

Chih-Cheng Chen

Department of Finance, Mingdao University, Taiwan

Chun-Hung Lee*

Department of National Resources and Environmental Studies, National Dong Hwa University, Taiwan

This study used the contingent valuation method (CVM) to estimate willingness to pay (WTP) to preserve cultural heritage, comparing the WTP to preserve the Peinan Cultural Heritage Site between cultural value clusters. The contingent behavior approach was applied to evaluate the economic benefits secured by the improvement of tourism quality at the site and examine the economic benefits of various hypothetical programs, including enhancing recreational experience, promoting the conservation of cultural resources, improving visitor services and infrastructure, and controlling negative impacts on cultural heritage. The empirical results were as follows. First, this study identified four cultural value dimensions, among which the most crucial multiperception clusters give recognition and reaffirmation of indigenous cultures as a central theme. Second, cultural value clusters differed significantly in terms of WTP ranges from US$128 to US$240 according to the average annual visitor numbers for the preservation of cultural heritage. Third, the multiperception clusters had the highest WTP values. Fourth, using the improvement of cultural recreation quality in all programs, the cultural recreation demand became more price-inelastic and the alternative cultural heritage site became a less attractive substitute. Fifth, the economic benefit of conserving cultural resources was higher than that of all other programs.

*Correspondence to: Department of National Resources and Environmental Studies, National Dong Hwa University, No.1, Sec. 2, Da Hsueh Rd., Shoufeng, Hualien, 97401, Taiwan. E-mail: chlee@gms.ndhu.edu.tw. The authors thank the Ministry of Science and Technology for providing project funding (grant no. NSC99-2410-H-259-059-SS2) to support this research.

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1 Introduction

This study examined the nonmarket value of the cultural heritage associated with the Peinan Cultural Heritage Site, the largest area ever excavated in Taiwan. The site has yielded numerous historical artifacts, including more than 1,600 slate coffins and 20,000 pottery and stone objects. The main area of the park measures approximately 20 to 30 ha and the site region comprises approximately 80 to 100 ha. The Peinan Cultural Heritage Site is invaluable for academic research, historical preservation, and public education (http://en.nmp.gov.tw/index.php).

Many of cultural economic studies that examine the multifacted dimensions of public cultural values are currently scarce. Most studies have adopted nonmarket valuation techniques to assess the economic value of culture and no study has examined the causal relationships of cultural value and experiential quality at cultural heritage sites with behavioral intention. In addition, no study has researched differences between cultural value clusters regarding cultural heritage preservation attitude, cultural heritage tour experience, and socioeconomic backgrounds.

Through the perspective of public attitude, perception, and behavior, and by referencing previous studies (e.g., Dunlap *et al*., 2000; Throsby, 2001; Mazzanti, 2002; and Artese *et al*., 2017) regarding factors in a cultural worldview scale, this study aims to establish a perceived cultural value scale and identify factors related to perceived cultural values using confirmatory factory analysis. Through cluster analyses, this study divides these factors into cultural value clusters, and examines differences between Peinan Cultural Heritage Site visitors regarding their cultural heritage preservation attitude, cultural heritage tour experience, and socioeconomic background through chi-squared tests. By establishing a perceived cultural value scale and examining the various factors of perceived cultural values, this study can serve as a crucial reference for the Council for Cultural Affairs in devising the educational propaganda of cultural heritage preservation and related management strategies. Furthermore, the grouping of cultural value clusters, and findings on the

differences between the cultural heritage preservation attitude, cultural heritage tour experience, and socioeconomic background of these clusters shall assist the Taitung County government and the National Museum of Prehistory in planning the market segmentation and positioning strategies of the cultural heritage site tour market.

The differences between cultural value clusters and willingness to pay (WTP) for cultural heritage preservation was examined, and the benefits of cultural value clusters in terms of cultural heritage preservation were estimated. The factor structure for cultural value was delineated as being generally consistent with those of previous studies, such as Dunlap *et al*. (2000), Hofstede & McCrae (2004), Choi *et al*. (2010), and Romão *et al*. (2016). Consequently, understanding segment clusters based on perceptions of cultural value can increase the accuracy of WTP models for cultural heritage preservation, as well as establish comprehensive groupings of perceptions of cultural value.

The field of cultural heritage recreation involves various problems regarding the quality of recreation experiences, service, infrastructure, and cultural resource maintenance (Poor & Smith, 2004; Alberini & Longo, 2006; Lee *et al*., 2011; Armbrecht, 2014). This influences the visitor demand for and recreation quality of cultural heritage sites. Thus, the quality of cultural heritage experiences was examined from the perspectives of visitors, determining their awareness of heritage and monument conservation and sustainable development at the Peinan Cultural Heritage Site. In addition, the revealed preference (RP) and stated preference (SP) for numbers of recreational trips were combined to assess quality improvement at the site.

This combination of behavioral data was used to propose an estimation method to measure the economic benefits of enhancing the quality of the Peinan Cultural Heritage Site through cultural improvement programs, thereby increasing recreation demand. Furthermore, the major problems of cultural heritage sites in realms such as recreation experience, service quality, infrastructure, cultural resource conservation, and negative effects on cultural heritage were evaluated. An onsite survey was conducted, gathering RP and SP data from visitors to assess policy-relevant improvements to the site. Panel recreation demand models were used, accounting for potential demand (SP) induced by high cultural heritage site quality, to estimate economic benefits. Finally, the empirical models and the results are described.

The rest of this paper is organized as follows. Section 2 describes the empirical model for the quality improvement of cultural heritage sites. Section 3 discusses the structure of the questionnaire and sampling plan. Section 4 presents estimates based on the panel recreation demand assessment, a discussion of elasticity estimates according to recreation demand, and comparisons of the economic benefits of quality improvement programs. Section 5 outlines some policy implications. Finally, section 6 presents a conclusion and suggestion.

2 Empirical Model of Quality Improvement

To evaluate the economic benefits of improving cultural heritage sites from a visitor perspective, a cultural heritage site recreation demand model was established, with the travel cost method (TCM) and panel recreation demand model (Whitehead *et al*., 2000; Noonan, 2003; Alberini *et al*., 2006; Poria *et al*., 2013) adopted to develop various hypothetical programs. These programs involved enhancing recreational experiences, conserving cultural resources, improving service quality and infrastructure, and controlling negative effects on cultural heritage. Furthermore, the cultural heritage site recreation demand function was estimated using the maximum likelihood method, and analyzed the factors involved. Finally, the price, cross, and income elasticities were estimated, as well as the consumer surplus of the proposed quality improvement programs. The theoretical and empirical methods are detailed in the following sections.

2.1 Theoretical Model

A visitor utility function, $U\left(x_j, q_j, Z\right)$, was employed, where $U(\cdot)$ is the visitor utility during a cultural heritage site visit; x_j is the annual number of trips to cultural heritage site *j*; *j* = 1,..., n; q_j is the quality of cultural heritage site *j*; and *Z* is a vector of all the other goods of cultural heritage site *j*. Visitors have budget constraints for visiting cultural heritage site *j*, calculated as $y = Z + p_j \cdot x_j$, where *y* is visitor income and p_j is the travel and time costs of visiting (or the implicit price of) cultural heritage site *j*. Therefore, to maximize visitor utility at cultural heritage site *j* under budget constraints, a Marshallian demand function was used to evaluate

site *j* (Whitehead *et al*., 2000) as follows:

$$x_j\left(p_j, q_j, y\right). \tag{1}$$

According to Equation (1), the consumer surplus of trips to cultural heritage Site *j* (i.e., the Peinan Cultural Heritage Site) is equal to the area below the cultural heritage site demand function and above the travel and time costs of visiting site *j*, namely $CS_j = \int_{p^0}^{p^c} x_j(\cdot)\, dp_j$, where p^0 is the price to visit site *j* and p^c is the choke price that forces x_j to zero. When the quality of a cultural heritage site improves from q to q', the recreational demand function shifts correspondingly. Therefore, the economic benefits of improving the quality of site *j* can be measured based on the change in *CS*, which is calculated as follows, based on the area between two demand curves above p^0:

$$\Delta CS = \int_{p^0}^{p^{c'}} x'(\cdot, q')\, dp - \int_{p^0}^{p^c} x(\cdot, q), \tag{2}$$

where $p^{c'}$ and p^c are the choke prices of cultural heritage site demand at quality q and q', respectively; and x and x' represent the demand for cultural heritage site trips at quality q and q', respectively. Finally, the economic benefits of implementing quality improvement programs at cultural heritage sites were measured. Such programs (e.g., enhancing recreational experiences, conserving cultural resources, improving service quality and infrastructure, and controlling negative effects on cultural heritage) typically reduce the elasticity of demand for recreation at a cultural heritage site; thus, alternative sites become unattractive and income elasticity decreases. Clearly, improving the quality of a cultural heritage site increases the economic benefits of visiting (Whitehead *et al*., 2000; Alberini & Longo, 2006; Lee *et al*., 2011).

2.2 Scenario Design and Empirical Models for Improving the Quality of Cultural Heritage Sites

To address how improving the quality of cultural heritage sites affects SP and RP recreation demands, two critical concerns were incorporated into the empirical models. First, visitors were asked about their current participation in, awareness of,

and demand for cultural recreation trips. The proposed improvements were then described to the visitors (e.g., enhancing recreational experiences, conserving cultural resources, improving service quality and infrastructure, and controlling negative effects on cultural heritage), who then estimated the number of trips they would make if these improvements were implemented. Second, factors affecting the demand for cultural recreation were considered, such as travel costs, the costs of visiting alternative sites, income, perceptions of and experiences regarding cultural heritage sites, and social background.

Poisson regression was used to study the data regarding the number of trips taken to a cultural heritage site in 1 year. Suppose that x_{it} is the number of trips made by visitor i. The mean can be determined using a Poisson distribution as follows (Whitehead *et al*., 2000; Alberini *et al*., 2006):

$$p\left(X_{it}=x_{it}\right)=\frac{e^{-\mu_{it}}\cdot\mu_{it}^{x_{it}}}{x_{it}!},\quad x_{it}=0,1,2..... \tag{3}$$

The mean μ_{it} depends on the explanatory variables for cultural heritage site recreation demand x_{it} and individual heterogeneity, as follows:

$$\begin{aligned}\ln\mu_{it}=\ln\omega_{it}+\mu_i=&\alpha_t+\beta_t COST_{it}+\delta_t SCOST_{it}+\theta_t INCOME_{it}\\&+\gamma_t PERCEIVE_{it}+\rho_t E1+\varphi_t E2+\tau_t E_3+\varepsilon_i\ ,\end{aligned} \tag{4}$$

where t = 1, 2 (specifically, t = 1 represents the current situation and t = 2 represents the situation following the implementation of improvements); *COST* represents the cost of visiting a cultural heritage site; *SCOST* is the cost of visiting an alternative site (e.g., the National Palace Museum in Taipei); *INCOME* represents visitor income; and *PERCEIVE* represents the perceived value of a cultural heritage site and the site preferences of visitors, namely E1, E2, and E3. E1 represents whether the visitors were members of a cultural heritage preservation group, E2 indicates whether they were aware that cultural heritage preservation is important, and E3 indicates whether they were familiar with the archaeological resources of the cultural heritage site.

To combine data from two trip scenarios and consider the potential structural changes in demand among these scenarios, a dummy variable was used when quality improvement was included: (t = 2), $D=1$, and $D=0$ (t = 1). Therefore, a general

cultural heritage site recreation demand model was established as follows:

$$\begin{aligned}\ln\mu_{it}=\ln\omega_{it}+\mu_i=&\alpha_t+\beta_t COST_{it}+\delta_t SCOST_{it}+\theta_t INCOME_{it}+\gamma_t PERCEIVE_{it}\\&+\rho_t\rho_t E1+\varphi_t E2+\tau_t E_3+a_2D_s+b_2D_sCOST_{it}+c_2D_sSCOST_{it}+\\&d_2D_sINCOME_{it}+\varepsilon_i\ ,\end{aligned} \tag{5}$$

where D_s represents the dummy variable used to incorporate quality improvement and S = 1, 2, 3, 4, 5 (representing the five quality improvement programs). If a coefficient of D_s is significantly different at zero, the visitor demand for cultural heritage site trips increases based on the improvement in quality. If the coefficient is not significantly different, the differences in elasticity of demand are represented by the interactions of the dummy variable with the own-price (D_sCOST), cross-price (D_sSCOST), and income ($D_sINCOME$) (Whitehead *et al*., 2000; Nanley *et al*., 2003).

The semi-log specification of demand shown in Equation (5) implies that the number of trips to a cultural heritage site increases after quality improvement (Whitehead *et al*., 2000). The ensuing economic benefits are presented as follows:

$$\Delta CS=\frac{x'}{\beta'}-\frac{x}{\beta}, \tag{6}$$

where x' is the number of trips to a cultural heritage site following quality improvement (q') and β' is the coefficient of travel cost following quality improvement (q'). If the coefficients of travel cost are the same in the current situation and that following quality improvement, Equation (6) can be simplified as follows (Whitehead *et al*., 2000):

$$\Delta CS=\frac{(x'-x)}{\beta}. \tag{7}$$

Therefore, the consumer surplus and other elasticity were estimated as nonlinear functions of the quality improvement of a cultural heritage site. The panel Poisson recreation demand model shown in Equation (5) was applied to test whether quality improvements cause structural changes in a cultural heritage site and estimate the elasticity, cross-elasticity, and income elasticity following improvement. Furthermore, the estimation results indicated the economic benefits of the five proposed quality improvement programs.

3 Questionnaire and Sampling Plan Structure

3.1 Questionnaire Design

The questionnaire in this study was divided into three sections. The first section was designed to assess how many trips a visitor had made to the site in the previous year. The questions also addressed the mode of travel, motivations for visiting, whether the visitors were members of cultural heritage groups, whether they were familiar with the characteristics and archaeological resources of the cultural heritage site, and the amount of time they spent at the cultural heritage site. To determine the key inputs of the travel cost model, the questions assessed (a) how far the respondents lived from the site and (b) the cost of traveling to the site. Finally, the respondents rated the perceived value of their current visit to the site on a scale from 1 to 5, with higher indicating that the perceived value exceeded the cost of the visit.

A quality improvement program was proposed according to various references (Whitehead *et al*., 2000; Mazzanti, 2003; Alberini & Longo, 2006; Alberini *et al*., 2006; Lee *et al*., 2011). The respondents were asked about five hypothetical programs that shared common themes: (a) enhancing cultural experiences at the site (e.g., the amount and quality of interpretive materials and the number of activities); (b) improving infrastructure (e.g., by repairing local roads, building bathrooms and rest facilities, and providing barrier-free facilities); (c) enhancing service quality (e.g., restaurants, recreational activities, information centers, and the attitudes of staff members); (d) conserving cultural resources (e.g., establishing a specific organization for protecting and maintaining the cultural resources of the site, limiting tourism at and development of the site, restricting access to unexcavated areas, and planning for a second National Museum of Prehistory); and (e) controlling negative effects on cultural heritage (e.g., limiting the daily number of visitors and preventing damage to the site by them, as well as that caused by climate factors and environmental changes). All of these items were mutually exclusive. The respondents were asked whether, assuming that the cost of a trip remained the same following these improvements, they would be willing to revisit the site, and if so, how many trips they would plan during the following year. The final section of the questionnaire recorded the sociodemographic characteristics of the respondents.

3.2 Sampling Plan and Descriptive Statistics

An onsite survey of visitors to the Peinan Cultural Heritage Site was conducted from March to April 2010 through purposive sampling, yielding 859 valid questionnaires that underwent frequency analysis. Of the respondents, 478 were women (55.6%) and 381 were men (44.4%). Most respondents were married (474; 55.2%), and many (36.4%) were aged 30–39 years. A total of 28.6% of the respondents were government workers, whereas 15.6% were students. Most respondents were highly educated, with 77.7% possessing a college education or higher.

3.3 Dependent Variables and Descriptive Statistics

The five proposed quality improvement programs were established based on previous studies. Table 1 lists the variables of the empirical model.

TRIPS indicates the total number of trips in the previous year; *COST* indicates the total cost per trip; *SCOST* indicates the total cost of visiting an alternative site; *INCOME* is monthly income; *PERCEIVE* indicates the total perceived value on a scale from 1 to 5; and $E1$ (1 if the visitor is a member of a cultural heritage group, 0 if not), $E2$ (1 if the visitor is familiar with the characteristics of the site, 0 if not); and $E3$ (1 if the visitor is familiar with the archaeological resources of the site, 0 if not) are dummy variables. The proposed scenarios for enhancing recreational experiences ($TRIPS1$), improving service quality ($TRIPS2$), improving infrastructure ($TRIPS3$), conserving cultural resources ($TRIPS4$), and controlling negative effects on cultural heritage ($TRIPS5$) involved dummy variables D_1, D_2, D_3, D_4, and D_5, respectively.

As shown in Table 1, the respondents made an average of 1.73 trips ($TRIPS$) to cultural heritage sites in the previous year. If the proposed quality improvement scenarios were implemented, their projected average number of yearly visits increased to 2.91($TRIPS1$), 2.86 ($TRIPS2$), 2.77 ($TRIPS3$), 2.88 ($TRIPS4$), and 2.75 ($TRIPS5$), yielding participation improvements of 79%, 75%, 69%, 75%, and 67%, respectively. The results also indicated that the most effective program for increasing participation in cultural heritage sites was enhancing recreational experiences, followed by conserving cultural resources, improving service quality,

improving infrastructure, and controlling negative effects on cultural heritage.

Table 1. The Empirical Data Summary in the Cultural Resort

Variable name	Description	Mean	Standard error
TRIPS	The average trips of cultural resort to the Peinan Cultural Heritage Site in past one year	1.73	0.059
TRIPS1	The average trips of cultural resort to the Peinan Cultural Heritage Site under "enhancing recreational experience program"	2.91	0.076
TRIPS2	The average trips of cultural resort to the Peinan Cultural Heritage Site under "improving visitor's service quality"	2.86	0.076
TRIPS3	The average trips of cultural resort to the Peinan Cultural Heritage Site under "improvement in infrastructure program"	2.77	0.076
TRIPS4	The average trips of cultural resort to the Peinan Cultural Heritage Site under "building a conserving theme of cultural resources quality program"	2.88	0.076
TRIPS5	The average trips of cultural resort to the Peinan Cultural Heritage Site under "building a control theme of cultural heritage impact"	2.75	0.075
D1	1 if the increasing in recreation participation of cultural resort under "enhancing recreational experience program"; 0, otherwise	0.79	0.014
D2	1 if the increasing in recreation participation of cultural resort under "improving visitor's service quality"; 0, otherwise	0.75	0.014
D3	1 if the increasing in recreation participation of cultural resort under "improvement in infrastructure program"; 0, otherwise	0.69	0.016
D4	1 if the increasing in recreation participation of cultural resort under "building a conserving theme of cultural resources quality program"; 0, otherwise	0.75	0.015
D5	1 if the increasing in recreation participation of cultural resort under "building a control theme of cultural heritage impact"; 0, otherwise	0.67	0.016
COST	The total cost of per trip(N.T. per person)	2,038.26	52.37
SCOST	The total cost of the substitution cultural resort(N.T. per person)	1,851.43	32.67
INCOME	The income per month	39,010	794
PERCEIVE	The total perceived value, scale from 1 to 5	4.02	0.027

Table 1. The Empirical Data Summary in the Cultural Resort (Continued)

Variable name	Description	Mean	Standard error
E1	Dummy variable, 1 if visitor join the group of cultural heritage, 0, otherwise	0.10	0.010
E2	Dummy variable, 1 if visitor knew the characteristics of the cultural resort, 0, otherwise	0.71	0.016
E3	Dummy variable, 1 if visitor knew the archaeological resources of the cultural, 0, otherwise	0.69	0.016

4 Empirical Results

4.1 Estimated Results of Panel Recreation Demand for Cultural Heritage Sites

The panel recreation demand functions of cultural heritage sites were estimated using the results of random effects Poisson estimation (Table 2). A likelihood ratio was used to test the goodness-of-fit of the proposed quality improvement programs: enhancing recreational experiences (Model I), improving service quality (Model II), improving infrastructure (Model III), conserving cultural resources (Model IV), and controlling negative effects on cultural heritage (Model V). Table 2 shows that all models significantly differed (significance level = .01); thus, the null hypothesis was rejected. This meant that the proposed models adequately measured the economic benefits yielded by improving the quality of a cultural heritage site.

The estimates for all five panel recreation demand functions were consistent regarding the signs and statistical significance of the parameters. *COST* was significantly negative ($p < .01$) among all models, indicating that the number of trips to the cultural heritage site decreased as the trip cost increased; this was consistent with the results of Whitehead *et al*. (2000), Alberini *et al*. (2006), and Lee *et al*. (2011). By contrast, *SCOST* was significantly positive ($p < .1$) among all models, indicating that the number of trips to the cultural heritage site increased as the cost of visiting alternative sites increased. Moreover, *INCOME* was significantly positive ($p < .01$) among all models, demonstrating that the number of trips to the cultural heritage site increased as income increased (Alberini & Longo, 2006; Lee *et*

al., 2011). Regarding the cognition of cultural heritage sites, $E1$, $E2$, $E3$, and *PERCEIVE* were significantly positive ($p < .01$) among all models, indicating that an increased number of trips to the cultural heritage site was associated with membership in a cultural heritage group, familiarity with the characteristics and archaeological resources of the cultural heritage site, and positive perceptions of the value of the site.

Table 2. The Empirical Results of Panel Recreation Demand in Cultural Resort

Variable name	Model I	Model II	Model III	Model IV	Model V
Constant	-1.24 (-8.67)	-1.12 (-7.84)	-1.16 (-8.10)	-1.15 (-8.00)	-1.21 (-8.40)
COST	-4.18E-04 (-19.76)***	-4.19E-04 (-19.83)***	-4.16E-04 (-19.63)***	-4.17E-04 (-19.75)***	-4.17E-04 (-19.65)***
SCOST	8.06E-05 (1.90)*	7.69E-05 (1.81)*	7.94E-05 (1.87)*	7.95E-05 (1.87)*	8.01E-05 (1.88)*
INCOME	9.40E-06 (8.72)***	9.38E-06 (8.68)***	9.34E-06 (8.64)***	9.37E-06 (8.69)***	9.36E-06 (8.68)***
PERCEIVE	1.52E-01 (8.22)***	1.28E-01 (7.03)***	1.28E-01 (6.94)***	1.29E-01 (6.98)***	1.41E-01 (7.70)***
E1	3.23E-01 (6.93)***	2.69E-01 (5.58)***	3.07E-01 (6.32)***	3.09E-01 (6.67)***	3.08E-01 (6.57)***
E2	1.73E-01 (3.61)***	2.43E-01 (5.20)***	2.42E-01 (5.07)***	2.26E-01 (4.52)***	1.98E-01 (3.96)***
E3	3.54E-01 (7.07)***	2.67E-01 (5.57)***	3.10E-01 (6.33)***	3.07E-01 (6.03)***	3.48E-01 (6.75)***
D1	6.52E-01 (4.31)***				
D1COST	2.55E-04 (9.70)***				
D1SCOST	-5.34E-06 (-0.10)				
D1INCOME	-2.78E-06 (-2.17)**				
D2		6.96E-01 (4.57)***			
D2COST		2.59E-04 (9.83)***			
D2SCOST		-4.32E-06 (-0.08)			
D2INCOME		-2.85E-06 (-2.22)**			
D3			7.68E-01 (5.01)***		
D3COST			2.37E-04 (8.91)***		
D3SCOST			-4.75E-05 (-0.89)		
D3INCOME			-2.91E-06 (-2.26)**		
D4				7.17E-01 (4.69)***	

Table 2. The Empirical Results of Panel Recreation Demand in Cultural Resort (Continued)

Variable name	Model I	Model II	Model III	Model IV	Model V
D4COST				2.74E-04 (10.33)***	
D4SCOST				-1.17E-05 (-0.22)	
D4INCOME				-3.33E-06 (-2.58)***	
D5					7.26E-01 (4.69)***
D5COST					2.46E-04 (9.20)***
D5SCOST					-3.61E-05 (-0.67)
D5INCOME					-3.08E-06 (-2.37)**
Chi-squared	937.71***	976.10***	923.66***	979.96***	907.49***

* significant at 10%, ** significant at 5%, *** significant at 1%

Regarding the relations among the quality improvement programs and panel recreation demand models, the RP trips were compared with the current quality and SP trips according to the improved quality. The quality improvement dummy variables of the cultural heritage site (D_1 , D_2 , D_3 , D_4 , and D_5) were significantly different from zero at the .01 level. This indicates that improved program quality at cultural heritage sites motivated visitors to make additional trips, whereas the other variables remained constant. The coefficients of the interactions among the quality improvement dummy variables (D_1, D_2, D_3, D_4 , and D_5) and own-price positively and significantly differed from zero at .01. The coefficients of the interactions among the quality improvement dummy variables (D_1, D_2 , D_3 , D_4 , and D_5) and income significantly differed from zero at the .05 level. The coefficients of the interactions among the quality improvement dummy variables (D_1, D_2, D_3, D_4 , and D_5) and the cross-price did not significantly differ. These results indicated shifts in the elasticities of recreation demand as the quality of cultural experiences improved (Whitehead *et al.*, 2000; Alberini & Longo, 2006; Jones *et al.*, 2017).

4.2 Elasticity Estimate Results Based on Cultural Heritage Site Recreation Demand

The results indicated that the elasticity and structure of recreation demand changed as the quality of the cultural heritage site improved. After these results were assessed, the elasticity of recreation demand for the cultural heritage site was assessed. The own-price, cross-price, and income elasticities of the panel recreation demand for the improved programs are presented in Appendix (see table 3 to 5). Notably, these values significantly differed from the current and improved qualities among the proposed programs. Therefore, as the quality of a cultural heritage site improved, the price elasticity of the demand for cultural recreation decreased, the alternative site became an increasingly unattractive substitute, and changes in visitor income did not influence demand. This is consistent with the results that have been reported by Whitehead *et al*. (2000), and Lee (2015).

Table 3. The Price Elasticity of Cultural Resort Demand under Quality Improvement

Model	Scenario	Price elasticity	T value
Model I	Current quality	-0.7372	-9.78***
	Enhancing Recreational Experience	-0.4742	
Model II	Current quality	-0.7404	-10.89***
	Improving visitor's service quality	-0.4515	
Model III	Current quality	-0.7360	-9.74***
	Infrastructure improvement	-0.4746	
Model IV	Current quality	-0.7375	-11.02***
	Building a conserving theme of cultural resources quality	-0.4471	
Model V	Current quality	-0.7368	-9.52***
	Building a control theme of cultural heritage impact	-0.4789	

*** significant at 1%

Table 4. The Cross Elasticity of Cultural Resort Demand under Quality Improvement

Model	Scenario	Cross elasticity	T value
Model I	Current quality	0.1177	10.90***
	Enhancing Recreational Experience	0.0772	
Model II	Current quality	0.1123	13.82***
	Improving visitor's service quality	0.0688	
Model III	Current quality	0.1161	11.98***
	Infrastructure improvement	0.0760	
Model IV	Current quality	0.1161	13.98***
	Building a conserving theme of cultural resources quality	0.0708	
Model V	Current quality	0.1170	12.19***
	Building a control theme of cultural heritage impact	0.0762	

*** significant at 1%

Table 5. The Income Elasticity of Cultural Resort Demand under Quality Improvement

Model	Scenario	income elasticity	T value
Model I	Current quality	0.2933	11.61***
	Enhancing Recreational Experience	0.1880	
Model II	Current quality	0.2929	12.94***
	Improving visitor's service quality	0.1777	
Model III	Current quality	0.2917	11.11***
	Infrastructure improvement	0.1894	
Model IV	Current quality	0.2925	13.10***
	Building a conserving theme of cultural resources quality	0.1765	
Model V	Current quality	0.2924	11.40***
	Building a control theme of cultural heritage impact	0.1889	

*** significant at 1%

4.3 Economic Benefits to a Cultural Heritage Site after Quality Improvement

Table 6 lists consumer surplus estimates following the implementation of the proposed quality improvement programs. The baseline number of trips at the current site quality (*TRIPS*) is equal to the predicted number of revealed behavior trips (*TRIPS1*, *TRIPS2*, *TRIPS3*, *TRIPS4*, and *TRIPS5*) and calibrated using the shift variable (D_1, D_2, D_3, D_4, and D_5) in the stated behavior model with current quality. The number of trips made to cultural heritage sites following the quality improvements can be predicted based on the revealed behavior trips and calibrated with improved quality coefficients according to the stated behavior among all quality improvement programs.

Table 6. The Economic Benefits of Cultural Resort under Quality Improvement

Model	Scenario	T value	Benefits (US$)	95% Confidence Interval(US$)
Model I	Current quality	-10.75***	138.2	(128.9 , 147.4)
	Enhancing Recreational Experience		221.1	(209.1 , 233.0)
Model II	Current quality	-11.73***	137.9	(128.7 , 147.1)
	Improving visitor's service quality		227.9	(216.0 , 239.8)
Model III	Current quality	-10.72***	138.7	(129.4 , 148.0)
	Infrastructure improvement		221.5	(209.5 , 233.5)
Model IV	Current quality	-12.00***	138.4	(129.2 , 147.7)
	Building a conserving theme of cultural resources quality		230.4	(218.6 , 242.3)
Model V	Current quality	-10.60***	138.6	(129.3 , 147.8)
	Building a control theme of cultural heritage impact		219.7	(207.9 , 231.4)

*** significant at 1%

In Model I, the annual consumer surpluses were US$138.20 and US$221.10 for

the current and improved quality, respectively, indicating a significant difference at the .01 level (t = −10.75). In Model II, the annual consumer surpluses were US$137.90 and US$227.90 for the current and improved quality, respectively, and were significantly different at the .01 level (t = −11.73). In Model III, the annual consumer surpluses were US$138.7 and US$221.5 for the current and improved quality, respectively, and were significantly different at the .01 level (t = −10.72). In Model IV, the annual consumer surpluses were US$138.40 and US$230.40 for the current and improved quality, respectively, and were significantly different at the .01 level (t = −12.00). Finally, in Model V, the annual consumer surpluses were US$138.60 and US$219.70 for the current and improved quality, respectively, and were significantly different at the .01 level (t = −10.60).

In summation, enhancing recreational experiences (Model I), improving service quality (Model II), improving infrastructure (Model III), conserving cultural resources (Model IV), and controlling negative effects on cultural heritage (Model V) yield significant positive influences and varied economic benefits. Conserving cultural resources was the most influential of the proposed programs.

5 Implications

5.1 Theoretical Implications

A total of 859 valid, formal questionnaires were collected from tourist participants at the Peinan Cultural Heritage Site. TCM was used to model the recreational requirements for the cultural heritage site. The aforementioned quality improvement programs were incorporated into a cost–benefit analysis (CBA). Each program was further included in the panel recreational requirements, and maximum likelihood estimation (MLE) was conducted. The results showed that several quality improvement programs clearly influenced the requirement structure.

This finding was consistent with the results obtained in previous studies through a combination of RP and SP (Alberini *et al.*, 2006; Alberini & Longo, 2006; Noonan, 2003; Whitehead *et al.*, 2000). The current annual average number of tourists (current quality) was used as the benchmark to estimate the elasticity of recreational requirements in various relevant models for cultural heritage sites

(own-price elasticity, cross-elasticity, and income elasticity) when the five types of quality improvement programs were implemented. The results indicated that the implementation of various quality improvement programs at the Peinan Cultural Heritage Site significantly addressed a multitude of tourists' recreational demands.

The programs can therefore not only reduce the price elasticity of tourists visiting the cultural heritage site and the appeal of substitute cultural heritage sites (e.g. the National Palace Museum) but also significantly affect the influence of variation in tourism income on the recreational demand for cultural heritage sites. Thus, quality improvement programs can improve the experiences of tourists at cultural heritage sites and significantly alter the recreational demand structure. The implementation of various programs can significantly reduce the influences of tourism costs and income factors on recreational demands related to the cultural heritage site investigated in this study or substitute cultural heritage sites.

5.2 Managerial Implications

Based on the panel recreational demand model for improving the tourism quality of cultural heritage sites and the elasticity estimation results for recreational demand structures for such sites, this study estimated the economic benefits of five types of tourism quality improvement programs. The results indicated that various programs can bring economic benefits to the Peinan Cultural Heritage Site.

The formulation of a quality maintenance plan exerted the greatest positive influence on recreational benefits. This was followed by improving the quality of public services, recreational experiences, and site infrastructure; and then by controlling the impact of tourism on cultural heritage. The aforementioned results showed that tourists visiting the Peinan Cultural Heritage Site prioritized improvements to the quality of tourist facilities. To do so, the Peinan Cultural Heritage Site should allocate a sufficient budget for the sustainable preservation and maintenance of cultural heritage assets. Areas of the site that have not been excavated should be protected to prevent damage from tourism and in preparation for second- and third-phase construction of the National Museum of Prehistory.

The public services improvement program resulted in the second-highest economic benefits. Thus, additional facilities should be installed in the exploration

area of the National Museum of Prehistory and improvements should be implemented (or facilities added) in rest areas, dining facilities, and environmental sanitation areas. The attitude and service quality of service personnel can also be improved. In short, improving the quality of public services should be emphasized.

6 Conclusion and Suggestions

The multidimensionality of culture identified by Throsby (2001) and Mazzanti (2003) suggests a need for the development of an instrument that can capture psychological characteristics for use in cultural studies and nonmarket valuation studies. In addition, drawing on a theoretical understanding of attitudinal factors as causes of behaviors and preferences, Choi *et al*. (2010) established the Cultural Worldview scale of cultural values. This study adapted the cultural value dimensions from this scale and attempted to segment cultural heritage markets using a CA based on perceptions of cultural value factors among visitors to the Peinan Cultural Heritage Site in Taitung, Taiwan.

The term “Cultural Heritage Site” encompasses cultural ruins, archaeological artifacts, monuments, buildings, and other heritage sites that have been deemed valuable in the realms of history, art, society, education, and academia, and subsequently placed under protection. They form the core of domestic and international cultural development, social and environmental education, and the development of cultural tourism. Plans to maintain and control the influence of cultural heritage tourism facilities can be used to integrate additional cultural, social, and environmental resources, and provide a developmental foundation for the Peinan Cultural Heritage Site.

Despite the aforementioned potential benefits that cultural heritage sites can provide, damage to cultural heritage resources, poor facilities and public services, limited opportunities for recreation, and aging infrastructure influence the quality of tourism experiences at these sites. These factors negatively affect the willingness of tourists to visit cultural heritage sites and subsequently reduce the various economic benefits provided by such tourism. The main contribution of this study is its use of CBA to construct a tourism quality improvement program for cultural heritage sites. By referencing previous research and considering the current situations of a cultural

heritage site, this study established five quality improvement programs (namely, improving recreational experiences, public services, and park infrastructure; formulating a quality maintenance plan for tourism facilities; and controlling the negative impacts of tourism on cultural heritage). By providing estimates of the economic benefits of such programs, the results of this study can aid various cultural heritage sites, county governments, and Taiwan's Ministry of Culture in drafting and assessing tourism activity plans for cultural heritage sites, budget allocation for tourism quality improvement programs, and tourism market management strategies.

Tourists highly value recreational experiences at cultural heritage sites. Educational commentary or guided tours of cultural heritage resources can be added and recreational activities can be advanced at the Peinan Cultural Heritage Site as part of an experiential marketing strategy. These changes can increase tourist satisfaction and motivation to preserve and maintain cultural monuments. Taiwan has numerous other large cultural heritage site and cultural assets, such as the National Palace Museum, National Museum of History, Shihsanhang Museum of Archaeology, and Yuanshan Site. Future improvement strategies for these sites should consider the aforementioned programs. Coordination between various units related to the cultural heritage sites, county governments, and the Ministry of Culture in implementing these programs will result in increased recreational demands for these cultural heritage sites, thereby raising their overall economic value. These improvements can facilitate the sustainable preservation and maintenance of Taiwanese Cultural Heritage Sites and assets.

This study used an onsite questionnaire distributed among a sample of visitors to estimate the economic benefits of five quality improvement programs. Therefore, nonvisitors were excluded. When using MLE to estimate WTP for cultural heritage preservation, this study analyzed influences on WTP, examined the differences between WTP for cultural heritage preservation and cultural value clusters, and finally evaluated the benefits of cultural heritage preservation and how they differed between cultural value clusters. In the future, investigations can be conducted as modeled by Whitehead *et al.* (2000), who researched how SP methods can be used to figure out the values of quality changes at a single cultural heritage site without imposing the presumption that the public responds to observational measures of site quality. The SP method enables estimation of consumer surplus exceeding the range

in variation of historical quality with consumer behavior data. Models that do not take structural changes in demands for different quality levels into consideration may result in bias consumer surplus measures.

Reference

Alberini, A. and A. Longo, (2006), "Combining the Travel Cost and Contingent Behavior Methods to Value Cultural Sites Evidence from Armenia," *Journal of Cultural Economics*, 30, 287-304.

Alberini, A., N. B. Simon, and A. Krupnick, (2006), "Willingness to Pay for Mortality Risk Reductions: Does Latency Matter," *Journal of Risk and Uncertainty*, 32, 231-245.

Alberini, A., V. Zanatta, and P. Rosato, (2007), "Combining Actual and Contingent Behavior to Estimate the Value of Sports Fishing in the Lagoon of Venice," *Ecological Economics*, 61, 530-541.

Andreu, L., E. Bigné, and C. Cooper, (2000), "Projected and Perceived Image of Spain Seize to Tourist Destination for British Travelers," *Journal of Travel and Tourism Marketing*, 9, 47-66.

Anna, A. and L. Alberto, (2006), "Combining the Travel Cost and Contingent Behavior Methods to Value Cultural Sites Evidence from Armenia," *Journal of Cultural Economics*, 30, 287-304.

Armbrecht, J., (2014), "Use Value of Cultural Experiences: A Comparison of Contingent Valuation and Travel Cost," *Tourism Management*, 42, 141-148.

Artese, M. T., G. Ciocca, and I. Gagliardi, (2017), "Evaluating Perceptual Visual Attributes in Social and Cultural Heritage Web Sites," *Journal of Cultural Heritage*, 26, 91-100.

Ashworth, G. J., (2000), "Heritage, Tourism and Places: A Review," *Tourism Recreation Research*, 25, 19-29.

Baloglu, A., (1998), "An Empirical Investigation of Attitude Theory for Tourism Destinations: A Comparison of Visitors and Non-Visitors," *Journal of Hospitality and Tourism Research*, 22, 221-224.

Baloglu, S. and K. W. McCleary, (1999a), "US International Pleasure Travelers' Images of Four Mediterranean Destination: A Comparison of Visitors and Nonvisitors," *Journal of Travel Research*, 38, 144-152.

Baloglu, S. and M. Mangaloflu, (2001), "Tourism Destination Image of Turkey, Egypt, Greece, and Italy Seize Perceived by US-Based Tour Operator and Travel Agents," *Tourism Management*, 22, 1-9.

Bedate, A., L. C. Herrero, and J. A. Sanz, (2004), "Economic Valuation of the Cultural Heritage: Application to Four Case Studies in Spain," *Journal of Cultural Heritage*, 5, 101-111.

Bigné, E., M. I. Sanchez, and J. Sanchez, (2001), "Tourism Image, Evaluation Variables and After Purchase Behavior: Inter-Relationship," *Tourism Management*, 22, 607-616.

Bockstael, N. E. and I. E. Strand, (1987), "The Effect of Common Sources of Regression Error on Benefit Estimation," *Land Economics*, 63, 11-20.

Brown, G. and R. Mendelsohn, (1984), "The Hedonic Travel Cost Methods," *The Review Economics and Statistics*, 66, 427-433.

Calantone, R. J., C. A. di Benetto, A. Hakam, and D. C. Bojanic, (1989), "Multiple Multinational Tourism Positioning Using Correspondence Analysis," *Journal of Travel Research*, 28, 25-32.

Cessario, F. J., (1976), "Value of Time Recreation Benefit Studies," *Land Economics*, 52, 32-41.

Chen, C. F. and D. C. Tsai, (2007), "How Destination Image and Evaluative Factors Affect Behavioral Intentions?" *Tourism Management*, 28, 1115-1122.

Chen, J. S., (2001), "To Marry Study of Korean Outbound Traveler's Destination Images by Using Correspondence Analysis," *Tourism Management*, 22, 345-350.

Chi, C. G. Q. and H. Qu, (2008), "Examining the Structural Relationships of Destination Image, Tourist Satisfaction and Destination Loyalty: An Integrated Approach," *Tourism Management*, 29, 624-636.

Choi, A. S., B. W. Ritchie, F. Papandrea, and J. Bennett, (2010), "Economic Valuation of Cultural Heritage Sites: A Choice Modeling Approach," *Tourism Management*, 31, 213-220.

Dunlap, R. E., K. D. V. Liere, A. G. Mertig, and R. E. Jones, (2000), "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale," *Journal of Social Issues*, 56, 425-442.

Fakeye, P. C. and J. L. Cromption, (1991), "Image Differences between Prospective, First-Time and Repeat Visitiors to the Lower Rio Grande Valley," *Journal of*

Travel Research, 30, 10-16.

Grogger, J. T. and R. T. Carson, (1991), "Models for Truncated Counts," *Journal of Applied Econometrics*, 6, 225-238.

Hofstede, D. and R. R. McCrae, (2004), "Personality and Culture Revisited: Linking Traits and Dimensions of Culture," *Cross-Culture Research*, 38, 52-88.

Holbrook, M. B. and E. Hirschman, (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feeling, and Fun," *Journal of Consumer*, 9, 132-140.

Hotelling, H., (1947), "Letter to the National Parks Service," *Economic Studies of Outdoor Recreation*, 56, 36-120.

Jones, T. E., Y. Yang, and K. Yamamoto, (2017), "Assessing the Recreational Value of World Heritage Site Inscription: A Longitudinal Travel Cost Analysis of Mount Fuji Climbers," *Tourism Management*, 60, 67-78.

Kandampully, J., (2000), "The Impact of Demand Fluctuation on the Quality of Service: A Tourism Industry Example," *Managing Service Quality*, 10, 10-18.

Kandampully, J. and D. Suartanto, (2000), "Costumer Loyalty in the Hotel Industry: The Role of Customer Satisfaction and Image," *International Journal of Contemporary Hospitality Management*, 12, 346-351.

Lee, C., Y. Lee, and B. Lee, (2005), "Korea's Destination Image Formed by the 2002 World Cup," *Annals of Tourism Research*, 32, 839-858.

Lee, C. H. and C. H. Huang, (2011), "Evaluation of Cultural Values and Willingness to Pay of Preserving Cultural Heritage," CES 2011 Annual Conference, Beijing, China.

Lee, C. H., C. H. Huang, and C. C. Chen, (2011), "Evaluation of Economic Benefits from Whale Watching Quality Improvement in Taiwan," The 2011 International Conference on Asia Pacific Business Innovation & Technology Management, Dalian, China.

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.

MacKay, K. J. and D. R. Fesenmaier, (1997), "Pictorial Element of Destination in Image Formation," *Annals of Tourism Research*, 24, 537-565.

Mansfeld, Y., (1992), "From Motivation to Actual Travel," *Annals of Tourism Research*, 19, 399-419.

Martin, F., (1994), "Determining the Size of Museum Subsides," *Journal of Cultural Economics*, 18, 225-270.

Mazzanti, M., (2003), "Valuing Cultural Heritage in a Multi-Attribute Framework Microeconomic Perspectives and Policy Implications," *Journal of Socio-Economics*, 32, 549-569.

Michael, E., (2002), "Antiques and Tourism in Australia," *Tourism Management*, 23, 117-125.

Muñoz, F., (2003), "Lock Living: Urban Sprawl in Mediterranean Cities," *Cities*, 20, 381-385.

Noonan, D., (2003), "Contingent Valuation and Cultural Resources: A Meta-Analytic Review of the Literature," *Journal of Cultural Economics*, 27, 159-176.

Poor, P. J. and J. M. Smith, (2004), "Travel Cost Analysis of a Cultural Heritage Site: The Cost of Historic St. Mary's City of Maryland," *Journal of Cultural Economics*, 28, 217- 229.

Poria, Y., A. Reichel, and R. Cohen, (2013), "Tourists Perceptions of World Heritage Site and its Designation," *Tourism Management*, 35, 272-274.

Poria, Y., R. Bulter, and D. Airey, (2003), "The Core of Heritage Tourism," *Annals of Tourism Research*, 30, 238-254.

Richards, G., (2000), "Tourism and the World of Culture and Heritage," *Tourism Recreation Research*, 25, 9-17.

Richards, G. and J. Wilson, (2006), "Developing Creativity in Tourist Experiences: A Solution to the Serial Reproduction of Culture," *Tourism Management*, 27, 1209-1223.

Romão, X., E. Paupério, and N. Pereira, (2016), "A Framework for the Simplified Risk Analysis of Cultural Heritage Assets," *Journal of Cultural Heritage*, 20, 696-408.

Shrestha, R. K., A. F. Seidl, and A. S. Moraes, (2002), "Value of Recreational Fishing in the Brazilian Pantanal: A Travel Cost Analysis Using Count Data Models," *Ecological Economics*, 42, 289-299.

Throsby, D., (2001), *Economics and Culture*, Cambridge University Press.

Whitehead, J. C., T. C. Haab, and J. C. Huang, (2000), "Measuring Recreation Benefits of Quality Improvements with Revealed and Stated Behavior Data," *Resource and Energy Economics*, 22, 339-354.