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ECONOMIC VALUATION OF CULTURAL HERITAGE TOURISM USING THE ZONAL TRAVEL COST METHOD: A CASE STUDY OF PERGAMON ANCIENT CITY[1]

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Abstract

This study evaluates the cultural heritage tourism value of Pergamon Ancient City in Turkey by using the Zonal Travel Cost method. The purpose of determining the economic value of cultural resources is to determine the value of the benefits in the rational use of resources ensuring their sustainability for transferring them to future generations. In the study, the Zonal Travel Cost method, which is one of the non-market valuation methods, was opted for attaining the economic value of Pergamon Ancient City. Initially, 330 questionnaires were distributed among the cultural tourists visiting the site with the purpose of cultural heritage tourism. Thus 33 zones are determined according to the distance traveled from the point of origin to the site. Multiple linear regression model was applied to estimate Zonal Travel Cost. The results indicated that the independent variables such as total spending, monthly income, gender, marital status, number of family members, and number of family working members were the effective variables in the model. Applying the model, the total consumer surplus value for Pergamon Ancient City was found to be 26.741.248.677 Turkish Liras (TL).

Key words: Economic Valuation, Zonal Travel Cost Method, Cultural Heritage Tourism, Pergamon Ancient City

JEL Code: B22, B41, Z30, Y80

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1. Introduction

Cultural heritage tourism is a prominent alternative tourism with the increased cultural needs of tourists in recent years. Cultural heritage tourism is derived from the interest and concern of viewing and visiting different places with the impulse of learning different cultures. Moreover, sea-sun-sand-oriented holiday tourism saturated in recent years, and nowadays the tourists are eager to learn about different cultures by traveling and visiting. Owing to technological and economic developments, cultural heritage tourism is enriched by the diversification of tourism products and services with utilizing cultural heritage assets to cultural heritage tourism, therefore generate more income from tourism and, hence provide a competitive advantage. Besides, cultural heritage tourism is becoming prevalent due to the change of the tourist profile with the increase in the level of education and internet usage. Eventually, the demand for cultural heritage tourism is accelerating with the increasing interest in cultural heritage sites. However, cultural heritage sites being the cultural heritage resources are limited for tourism. Therefore, it is required to estimate the economic benefit of cultural heritage sites for optimum allocation of these scarce resources.

In the economy, the resources are allocated according to the value of the assets. Cultural heritage sites are characterized as non-market goods, providing a wide range of tourism product and service. Cultural tourists all over the world are disposed to visit the cultural heritage sites for viewing the unique structures from ancient times. On the other hand, the sites require conservation and preservation against the damages that can be caused by visiting the sites over their bearing capacity and reckless human activities towards the historical structures of the site. Therefore, the economic valuation of the cultural heritage sites should be determined according to the consumption behavior in the related markets. Determining the economic value provides the cultural heritage areas to be used more consciously and managed sustainably, that can be protected and transferred to the next generations.

There are appropriate non-market valuation methods to estimate the true economic value of the cultural heritage sites. An economic valuation can be utilized to manage cultural sites and to assist a range of policy decisions, because economic valuation estimates the benefits associated with conservation measures, as well as forecasting the demand for a cultural asset. Economic valuation is very useful in financing cultural heritage investments because it measures the gap between the benefits provided to society by the cultural heritage site and the costs incurred. It also provides information about the financing strategy and specifies the need for subsidies to cultural heritage. Furthermore, economic valuation is crucial in resource allocation between cultural sites while evaluating which sites worth more investment at a given time (Prontzas, 2017: 222).

A microeconomic model should be defined as describing the behavior of an individual while measuring the economic value of a non-market good. Hence, the

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Travel Cost method is a non-market economic valuation technique that provides to obtain a value on sites by using consumption behavior in related markets (Chen et al., 2004: 399). The method has become widely accepted and is generally regarded as one of the common and successful non-market economic valuation methods of cultural heritage sites. There are essentially two types of Travel Cost models, which are the Individual and Zonal Travel Cost models. In the Individual Travel Cost model, the dependent variable is the number of trips per year by individual users of a site that is more appropriate for local and frequently visited sites. On the other hand, the dependent variable in the Zonal Travel Cost model is the number of trips taken to the site by the population of a particular zone that is more appropriate for sites visited infrequently by visitors from other zones. In this study, the Zonal Travel Cost method is applied to value the cultural heritage tourism of Pergamon Ancient City. This ancient city is one of the most frequently visited popular destinations of cultural heritage tourism in the West of Turkey.

2. Literature Review

The Travel Cost method was initially proposed by Clawson (1959) to determine the economic value of non-market sites. The purpose of the Travel Cost method is to provide an economic value of a cultural heritage site by creating a demand curve based on the utility maximization of users (Bedate et al., 2004: 102). This method is applied to spendings and travel time to express the value that people attach to visiting a particular site (Baker and Ruting, 2014: 4). The Zonal Travel Cost method is one of the popular methods among researchers, developed to estimate the value of specific sites of non-market resources. Interest in developing these methods increased environmental awareness, therefore, conservation and preservation issues became more essential. Several studies are applied the Zonal Travel Cost method while obtaining the economic value of a particular site.

In the study of Menz and Wilton (1983), aimed to examine the economic value of sea bass fishing in the St.Lawrence River, east of Lake Ontario in New York. The angling areas in the study are defined as two special parts of the Lawrence River and three parts of eastern Ontario Lake. The data were taken from a survey of New York licensed local fishermen in 1976. As a result of the study, consumer surplus values range from 11.6 to 72.2 US dollars at 1976 prices per hunting day. Hanley (1989) intended to estimate the recreation value of Queen Elizabeth Forest Park, located in the center of Scotland. For this purpose, in the summer of 1987, 1,148 surveys were conducted in two locations: the David Marshall Lodge visitor center and Achray Forest Drive. In the Zonal Travel Cost practice, visitors whose purpose was to visit the park were taken into consideration and therefore the number of questionnaires evaluated was 319. In the study, the values obtained by Zonal Travel Cost and Conditional Valuation method were compared. The consumer surplus value determined by the Zonal Travel Cost method was found to be £ 160,744 and the consumer surplus value gathered by the conditional valuation method was £ 181,250.

Willis and Garrod (1991) purposed to determine the value of forest recreation and opted for 6 forest resting places which are Brecon, Buchan, Cheshire, Lorne, New Forest, and Ruthin. Consumer surplus values per visitor were found for each forest resting place. These values range from £ 0.40 (for Cheshire) to £ 2.32 (for New Forest). Richards and Brown (1992) proposed to estimate the use-value of 10 forest camps in Arizona in the summer of 1985. Individual consumer surplus values were found different for each campsite, varied between 10.2 and 92.2 US dollars according to 1985 prices. Another study of economic valuation of the recreational site was held by Riera et al. (1994) in which the Zonal Travel Cost method was applied to Pallars Sobira Nature Park in the Catalunya region of Spain. In the study, two different calculation approaches were used to calculate the travel cost. In the first calculation approach, the travel time, which was accepted as 25% of the transportation expenses and the salary coefficient was taken as the basis, in the second approach, the vehicle's depreciation and travel time (75% of the salary coefficient) was employed. Consumer surplus values obtained in the study were found as 758 and 1,138 Spanish Pesetas, respectively (cited in Ortaçeşme et al. 1999).

Beal (1995) soughed to determine the recreational use value of Carnarvon Gorge National Park in the northeast of Australia. It was divided into 12 regions according to the national park distances. The estimated consumer surplus value was determined as $ 2.4 million, and the net present value of the future recreational use of the park was determined as $ 40 million with 1993-94 values depending on the real interest rate of 6%. Kaya et al. (2000) examined the economic values of the recreation site of Soğuksu National Park which is the most important visitor origin in Ankara, Turkey. The study aimed to estimate and compare the recreational value by using travel cost and contingent valuation methods. The findings revealed that the consumer surplus per capita was estimated at, with prices in 1999, 1,287 million TL with Zonal Travel Cost method and 2,096 million TL with Contingent Valuation method.

One of the studies of the Zonal Travel Cost method was applied by Lansdell and Gangadharan (2003) to compare and estimate the recreational values of two parks; Albert Park and Maroondah Reservoir, in Victoria, Australia. According to the double log functional model, the recreational value of Albert Park's was found as $22,9 million, and Maroondah Reservoir's at a value of $2.5 million per year. In their studies, Chen et al. (2004) aimed to determine the economic value of the recreational benefit of the public beach located on the east coast of China's Xiamen Island. For this purpose, semi-interview questionnaires were applied to 560 visitors in the summer of 1999 and were randomly selected. In the study, 34 zones were determined, thus consumer surplus was calculated as $ 16.9 per visitor and the total consumer surplus was $ 53.5 million.

In the study of Poor and Smith (2004) the economic value of Historic St. Mary's City, the 17th century British Colonial capital of the State of Maryland, was calculated. As one of the first studies to use the Zonal Travel Cost model that predicts the consumer surplus of a cultural heritage site, the data of the visitors in

this study was provided by Mary's City Commission. In the study, three-year visitor sample data were analyzed to compare three functional forms of visitor demand. In total, there were 92 observations based on zones between the period of 1999 and 2001. The average individual consumer surplus was ranged from $8.00 to $19.26. Aggregating the total number of individual paid visitors, the average annual benefit estimates range from nearly $ 75,492 to $ 176,550.

In the study of Gürlük (2006), the willingness to pay was taken into account to determine the ecosystem value of Lake Manyas, in Turkey. The questionnaires for the Conditional Valuation study were applied to 134 visitors from June to August 2004. The Zonal Travel Cost method was applied to reveal the visitor demand of the Bird Paradise National Park. To find the recreational value of Bird Paradise National Park, the number of samples was determined as 228 with the sampling technique. The zones are classified at intervals of 50 km according to the distances of visitors resulted in 14 zones in total. The annual total consumer surplus-value of Bird Paradise National Park was found as 10,342,783,744 YTL, and the total economic value of Lake Manyas is 14,809,183.74 YTL / year. Stoeckl and Mules (2006) aimed to determine the recreation value of the Alps in Australia in their study. The study constitutes residents of seven different zones of the three countries around the Alps. The data obtained from 4791 visitors between the period of March 2001 and February 2002. Additionally, the information gathered from the Australian Statistical Bureau was also counted as data. The findings revealed that the recreational value of the Australian Alps was at least $ 10 billion and at most $ 200 billion.

Fleming and Cook (2008) determined the recreation value of Fraser Island, the largest sand island in the world. In the study, 463 questionnaires are gathered but 430 of these were analyzed. The unadjusted estimated consumer surplus value was calculated as $ 417,494,101 annually, and the adjusted annual estimated consumer surplus value was $ 191,353,287. In the study of Bharali and Mazumder (2012), the Zonal Travel Cost method was applied to estimate the revenue maximization entry fee of Kaziranga National Park. The study was based on primary data collected from 300 visitors in the winter of 2010-2011, and visitors were classified into 8 zones. The total recreation value of the park was estimated at 773.45 million rupees. Income maximization entry was estimated at 187.6 rupees per visitor assuming zero entry fee. Limaei et al. (2014) aimed to determine the recreational and socio-economic values of the Masouleh Forest Park in northern Iran. For this purpose, questionnaires were applied to 96 visitors. In this study, 5 zones were determined according to the distances surrounding the recreation area. The results of the study revealed that visitors were willing to pay an average of 12,500 Iranian Rials per visit, and the average round trip travel cost was 85,5 (10,000 Iranian Rials).

Tourkolias et al. (2015) intended to estimate the consumer surplus and total values attributed to the Poseidon Temple in Sounio, one of the most important archaeological sites in Greece. For this purpose, the questionnaires were applied to

150 visitors from various zones of Greece and foreign countries between May and July 2011. In the study, 6 zones were determined to develop the Zonal Travel Cost model. As a result of the study, the consumer surplus to visit the Poseidon Temple varied between 1.5-24.5 million € per year. Jala and Nandagiri (2015) purposed to determine the economic value of water for recreational use in Mangalore Pilikula Lake, India. For this purpose, the questionnaires were applied to 500 visitors in Pilikula Lake from 6 December 2012 to 7 January 2013. In the study, the surrounding area of Pilikula Lake was divided into 6 zones of increasing distance. The average willingness of the tourists for the recreation benefits of the lake is 36.75 rupees with the Conditional Valuation method, and 238 rupees with the Zonal Travel Cost method, the average payment willingness to improve the extra facilities of Pilikula Lake is 36.75 rupees, the average payment willingness to improve the lake water was found as 40.13 rupees.

Limaei et al. (2017) aimed to estimate the recreation and economic value of Saravan Forest Park in the north of Iran. For this purpose, a survey was applied to 480 visitors in different seasons (2014 autumn and winter, 2015 spring and summer). The results of the study stated that the daily value of recreation area or consumer surplus is 68,319,800 Iranian Rials. Kaya et al. (2018), reported forecasting the zonal forest recreation demand in Ankara, Turkey. The research area covers national parks, nature parks, picnic areas, urban forests, and many other outdoor recreation sites. The survey studies were conducted between July 2014 and August 2016. The surveys were conducted to a total of 350 actual visitors, 600 potential visitors. In the study, 312 actual and 556 potential visitor surveys were evaluated by eliminating the erroneous and incomplete surveys. The demand curve formed using the data obtained from all the users revealed that the travel cost increasing up to 503 TL has positive effects on revenues from the forest recreation sites as the arc elasticity values in this range were between 0.01 and 0.75.

The literature review ascertains that most of the studies applying the Zonal Travel Cost method utilized to determine the recreational value of parks and natural resources such as lakes, beaches, and islands. This model is widely utilized to obtain a recreational consumer's value of visiting a site. A few studies implemented the model to cultural heritage and archaeological sites for determining the economic value of the sites. This study opted for a cultural heritage site, Pergamon Ancient City, as a study area, contributes to the literature promoting the economic valuation of the cultural heritage sites with the concern of conservation and preservation of the sites to the next generations.

3. Methodology

Zonal Travel Cost Method

The Zonal Travel Cost method was first implemented and developed by Clawson in the late 1950s and 1960s (Das, 2013: 6). The dependent variable in the Zonal Travel Cost method is the number of trips to the site by the population of a particular zone. The Zonal Travel Cost method is suitable for sites that are rarely

visited by remote visitors (Fleming ve Cook, 2008: 1198). To calculate the Zonal Travel Cost, the number of visitors from each zone is determined. The proportional frequency of visits from the zones is calculated by dividing the number of visits from the relevant zone by the population of that zone (Ortaçeşme et al.,1999: 114).

The simplest implementation of the method is applied by collecting information about the number of visits from different distances (from zones) and the round trip cost from each of these zones. Then, visit rates from different zones are regressed on travel costs and other socio-demographic variables to establish a mathematical relationship, which allows depicting the demand curve of that site in the question (Tourkolias et al., 2015: 568).

The equation of the Zonal Travel Cost method is as follows (Lansdell & Gangadharan, 2003: 408):

$$V_z = f\,(TC_z, SD_z,) \qquad (1)$$

V_z : Estimated total number of visitors to the site per year,
TC_z : Travel cost from zone z to visit the site,
SD_z : Socio-demographic characteristics of the population of zone z (e.g. income, gender, education)

Table 1: Steps of Calculating Consumer Surplus with Zonal Travel Cost Method

Steps	Content
(i)	Zone Number
(ii)	Number of Households
(iii)	Annual Household Visits
(iv)	Average Number of Household Visits
(v)	Average Travel Cost per Household Visit
(vi)	Consumer Surplus per Household Visit
(vii)	Total Annual Consumer Surplus

Source: (Adopted from Das, 2013: 5).

The steps involved in the calculation of the Zonal Travel Cost method are explained as follows (Gürlük, 2006: 78-79; Das, 2013: 6):

i. Initially, data from the visitors from the zones are collected and the number of tourists visiting the site in a certain period is obtained.
ii. In the second step, the zones are defined according to the distance traveled from the point of origin to the site and the populations of the zones are obtained for the defined zones.
iii. In the next step, annual household visits to the zone are determined.
iv. In the fourth step, the average household visits from each zone are calculated by dividing the number of household visits from each zone by the zone's population.

v. In the fifth step, the average zonal travel cost of visits is calculated taking into account the distance from the traveling point to the site.
vi. In the next step, the annual total consumer surplus of each zone is estimated for the site. To obtain the zonal average consumer surplus per household visit, the total household consumer surplus is divided by the average number of zonal visits by each household. Then, this is multiplied by the zonal average annual number of visits and annual zonal consumer surplus is obtained.
vii. By summing the annual zonal consumer surplus in all zones, the annual total consumer surplus of all tourism activities achieved by visiting the site is obtained.

Survey Design and Sampling

Pergamon Ancient City, one of the most important historical points in the city and Turkey, is located in Bergama district of Izmir. Pergamon Ancient City was established 8500 years ago and rank among the UNESCO World Cultural Heritage List since 2014. Hence, the site is selected for this study as it is one of the most popular cultural heritage tourism destinations in Turkey. The survey is conducted at the cultural heritage site and the sample size is determined from the visitors of the site. Thus, the sample size is an important issue for an accurate estimation of the economic value of the site. The universe is the whole group of units determined in line with the objectives determined within the scope of the research. The sample is the subgroup that represents the universe and is selected from the main mass according to a certain method (Nakip, 2003: 176). The universe of this study is consisted of domestic tourists visiting Pergamon Ancient City in August 2019.

Pergamon Ancient City was visited by 12,311 domestic tourists in August 2019 (www.berto.org.tr). The sample of the study consists of tourists selected by a simple random sampling method. Since the number of tourists visited the site is known, the sample size is calculated by using the equation below (Özdemir et al., 2015: 159).

$$n = \frac{N*t^2*p*q}{d^2*N+ t^2*p*q} \quad (2)$$

n: number of questionnaires (sample size),
N: population size (number of tourists that visit the cultural heritage site),
p: expected prevalence (probability of occurrence is accepted as 50%),
q: expected non-prevalence (1-p),
t: coefficient of confidence interval (t = 1.96 at 95% confidence level)
d: degree of accuracy or error percentage (ranges usually from 1 to 10%, accepted as 6%).

Replacing the values of the equation, the required sample size is calculated as 268. To collect the necessary data for the study, 330 tourists were interviewed with face to face questionnaire technique in August 2019. The questionnaires were distributed randomly among the tourists in the peak month of the year. In the peak

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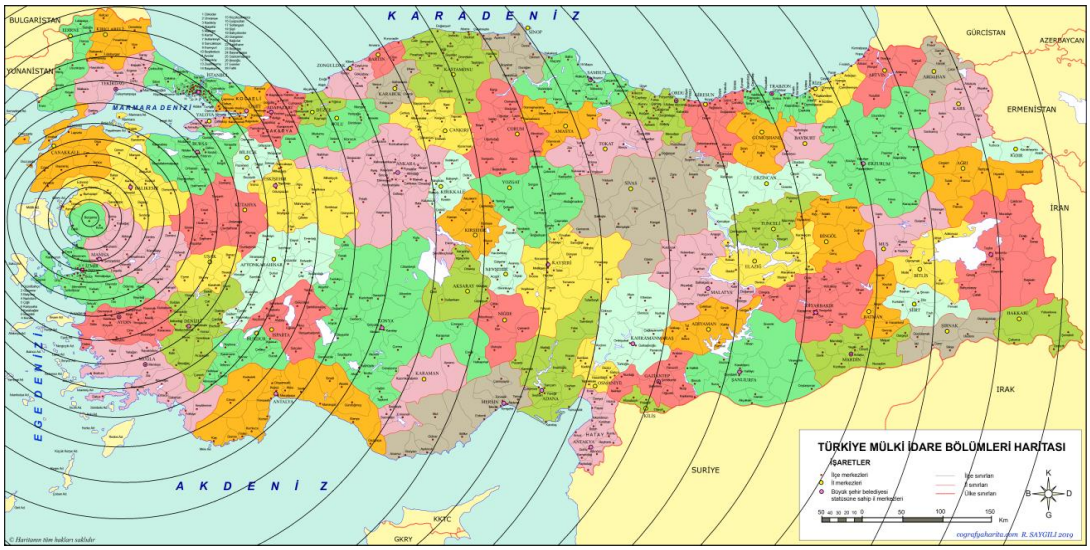
month, the number of tourists was greater than the other months comparatively and considered as representative of the total visits in one year.

Application of the Zonal Travel Cost Method

The Zonal Travel Cost method, one of the Travel Cost methods, is used in this study. According to the method, domestic tourists are grouped due to the distance of the settlements to the cultural heritage site. In the Individual Travel Cost method, the unique characteristics of each visitor are taken into consideration in the analyzes, on the other hand, in the Zonal Travel Cost method the average values (group averages) obtained from the tourists from the zones are taken into consideration.

In this study, 330 tourists represent 33 zones according to the distance of the origins to Pergamon Ancient City. The tourists visiting the site are grouped at intervals of 50 km. according to the distance to the site. The grouping process continued with 50 km. intervals, until each tourist is involved in the zones. The classification of the domestic tourists according to the zones visiting Pergamon Ancient City is determined by the Turkey Civil Administration Maps. The figure depicts the zones of domestic tourists allocated according to the distances from the traveling to the origin point of the cultural heritage site.

Figure 1: Classification of Settlements by Distances to Pergamon Ancient City



Source: Turkey Civil Administration Maps (accessed March 21th, 2020)

In the Zonal Travel Cost method, the dependent variable is the number of visits per 1,000 people. The number of visits per 1,000 people is calculated as follows (Lansdell and Gangadharan, 2003: 407).

$$V_z = \left[\left(\frac{n_z}{v_t}\right) T\right] * \frac{1000}{pop_z} \quad (3)$$

V_z : Number of visits per 1,000 tourists
n_z : The number of tourists from the z region
v_t : Number of tourists included in the study
T : Total number of tourists coming to the cultural heritage site within a year
pop_z: Total population numbers in the z^{th} region

The number of population of the origins that the tourists departed are obtained from the Address Based Population Registration System of Turkey Statistical Institute (www.turkstat.gov.tr). The population numbers of the origins are obtained according to the data of the year 2019.

4. Findings

Findings of Socio-Demographic Characteristics

The questionnaires were distributed among the tourists visiting Pergamon Ancient City in August 2019 which was the peak season. The respondents were domestic tourists and 330 questionnaires were utilized in this study. The socio-demographic characteristics stated in the questionnaires are also the independent variables of the Zonal Travel Cost model. According to the findings just over half of the respondents are female (51.5%), and the remaining are male (48.5%). Most of the respondents are married (59.7%) while the rest of the respondents are single (40.3%). Most of the respondents have a bachelor's degree or above (82.4%), and most of the remaining have a high school graduate (13.6%) and the rest have compulsory education (3.9%).

In Turkey, family unity attachment is common that the information about family members was taken into account in the survey. Accordingly, most families in Turkey consists of 4 members (33.6%) and are followed by 3 members (30.6%). The families that are less than 3 members (22.1%) and more than 4 members (13.6%) are remaining. Since tourism usually has a luxury consumption feature, the number of members in the family is also taken into consideration in the research. According to this, more than half of the respondents state just 2 members work in the family (51.5%) and it is followed by one member working in the family (29.4). Respondents were comparatively wealthy, reporting a mean monthly household income of approximately 4,351.52 TL, which is above the minimum wage. Further, most of the respondents report a monthly household income above 3,750 TL (67.6 %), and the remaining is below this income (32.4%). Summary descriptive statistics of the socio-demographic characteristics in the study are presented in Table 2.

Table 2. Descriptive Statistics of Socio-demographic Characteristics

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	330	1.00	2.00	1.4848	.50053
Marital Status	330	1.00	2.00	1.5970	.49125
Education	330	2.00	6.00	4.9545	.76853
Number of Members in Family	330	1.00	8.00	3.4061	1.17934
Number of Working Members in Family	330	.00	5.00	1.7758	.87763
Monthly Income	330	500.00	8000.00	4351.5152	2517.55191

Findings of Travel Cost Descriptives

Travel costs (TC) were obtained per tourist and include transportation, accommodation, food & beverage, souvenirs, and other costs, entrance, and parking fees. The descriptive statistics of each travel cost is represented in Table 3. According to the descriptive statistics, the mean of the travel cost is 433.41 TL and the majority of the costs consist of transportation costs with a mean of 162.58 TL (37.51%). Food and beverage costs are the second majority spending item with a mean of 94.64 TL (21.84%). The third and fourth items of the tourist spending items are entrance fee and accommodation costs with means 70.60 TL (16.29%) and 70.03 TL (16.16%) respectively. Souvenir costs are followed by other costs and parking fees with a mean of 24.52 TL (5.66%), 6.19 TL (1.43%), and 4.86 TL (1.12%).

Table 3. Descriptive Statistics of Travel Cost

	N	Minimum	Maximum	Mean	Std.Deviation
Transportation Costs	330	.00	2000.00	162.5818	253.39289
Food & Beverage Costs	330	,00	2000.00	94.6424	160.67369
Entrance Fee	330	.00	350.00	70.6030	58.29422
Accommodation Costs	330	.00	1600.00	70.0303	188.12020
Souvenir Costs	330	.00	1500.00	24.5152	105.00286
Other Costs	330	.00	105.00	6.1818	19.61941
Parking Fee	330	.00	40.00	4.8545	6.49644
Total Travel Cost (TC)	330	.00	4675.00	433.4091	516.50747

Regression Analysis

In this study, the demand equation of visiting Pergamon Ancient City from each zone is determined, and the travel cost variable is replaced by the price variable in the traditional demand equation. The demand equation for the use of the site is estimated by associating the number of visits (V_z) per 1.000 people in the z zone and the travel cost (TC_z) of visitors from the z zone and the socio-demographic (SD_z) characteristics of the population of zone z (Chotikapanich and Griffiths, 1996: 3; Lansdell & Gangadharan, 2003: 408):

$$V_z = f\,(TC_z\,,\, SD_z,) \tag{4}$$

Where, $z = 1, \ldots \ldots, 33$

To obtain the demand function, multiple regression analysis is utilized where the number of zonal visits is the dependent variable representing the quantity. Therefore, the number of the zonal visit is regressed against the average zonal travel cost (AZTC) and the average of six independent variables (monthly income, gender, marital status, education, number of members in the family, number of working members in the family) related to the z zone. Some of the variables (income and education) are typical with Zonal Travel Cost studies (Beal, 1995; Nillesen, et al., 2005). Besides the other variables are included in the model because they are found effective in the present model (gender, marital status, number of members in the family, number of working members in the family). The continuous variables (number of zonal visits, travel cost, and monthly income) are converted by logarithmic transformation to provide the necessary assumption of normal distribution. The analyzes are carried out with the SPSS statistical software program and the results of the analysis are presented in the following tables.

Table 4. The Results of Multiple Regression

Variables	Coefficient	Std.Error	t	p	Model Summary
Constant	-12.919	10.743	-1.203	.295	F=12.375
Log_Total Cost (TC)	-1.932	.676	-2.858	.046	P=0.014
Log_Monthly Income (MI)	12.095	2.988	4.048	.016	R=0,978
Education (E)	-2.195	.595	-3.687	.021	R^2=0.956
Gender (G)	-2.393	.939	-2.548	.063	Adjusted
Marital Status (MS)	-2.942	1.079	-2.725	.053	R^2=0.879
Number of Family Members (NFM)	-2.911	.716	-4.066	.015	
Number of Family Working Members (NFWM)	2.444	.804	3.038	.038	

When the analysis results are conducted, it is found that the multiple linear regression demand model is significant as a whole ($p = 0.014<0.05$). Besides, the R^2 value (95.6%), which indicates how much of the change in the dependent

variable is explained by the independent variables, is too high. Independent variables in the model can explain 95.6 % of the dependent variable.

According to the regression results, the number of visits decreases as the travel cost increases in the zonal travel cost method. The analysis shows that there is a significant (p=0.046) and negative (β=-1.932) relationship between travel cost (independent variable) and the number of visits (dependent variable). Moreover, the findings reveal that there is a significant (0.016) and positive (β=12.095) relationship between monthly income (independent variable) and the number of visits (dependent variable). This result also displays that as monthly income increases when travel costs increase. Another important result is the significant (p=0.038) and positive (β=2.444) relationship between the number of working members in the family (independent variable) and the number of visits (dependent variable). This result indicates that when the number of working members in the family increases, the number of visits also increases. On the contrary, when the number of members increases in the family, the number of visits decreases demonstrating a significant (p=0.015) and negative (β=-2.911) relationship. Additionally, other socio-demographic variables (education, gender, and marital status) have a negative and significant relationship with the dependent variable at 5 and 10% levels.

The demand function is expressed by the coefficients retrieved from Table 4 as follows:

$\log v_z$ = - 12.919 – 1.932 * log (TC)+ 12.095 * log (MI)- 2.195(E)- 2.393 (G)-2.942(MS) – 2.911 (NFM) +2.44 (NFWM)

The purpose of the study is to obtain the consumer surplus-value of the cultural heritage site applying the Zonal Travel Cost method. In the study, the total consumer surplus-value is estimated by using the following equation (Chotikapanich ve Griffiths, 1996: 4-5; Bharali ve Mazumder, 2012: 47):

$$\ln(V_z) = \beta_0 + \beta_1 \ln(TC_z) \quad (5)$$

$$V_z = exp\{\beta_0 + \beta_1 ln(TC_z)\} = e^{\beta_0}(TC_z)^{\beta_1} \quad (6)$$

$$TR = \frac{-e^{\beta_0}}{\beta_1+1}\sum_z(pop_z)\,(TC_z)^{\beta_1+1} \quad (7)$$

The population and average travel cost values of each region and the coefficients (β_0=-12.919; β_1=-1.932) are included in the demand function are substituted in the equations above, the total consumer surplus-value is 26,741,248,677 TL (Turkish Liras).

5. Conclusions

The purpose of determining the economic value of a cultural heritage site is to ensure the sustainability of cultural heritage sites through rational use and transferring to future generations. In the study, to determine the economic value of Pergamon Ancient City the Zonal Travel Cost method is utilized which is one of the non-market valuation methods. To obtain the data 330 questionnaires were conducted face to face. The respondents are the domestic tourists visiting Pergamon Ancient City in August 2019. The zones are classified by grouping the tourists according to traveling distances ranging 50 km. intervals, resulted in 33 different zones. The ranging distance intervals of the tourists are gained through Republic of Turkish Ministry of Transport and Infrastructure. The dependent variable is the number of visits from the zones which is calculated by using the equation of the study of Lansdell and Gangadharan (2003). The independent variables of the multiple regression model to calculate Zonal Travel Cost are the socio-demographic variables of the tourists. Some of the independent variables (income and education) are typical with Zonal Travel Cost studies (Beal, 1995; Nillesen et al., 2005). Besides the other variables are included in the model because they are found effective in the present model (gender, marital status, number of members in the family, number of working members in the family).

According to the multiple regression results, the number of visits decreases as travel costs increase, thus, a negative relationship is found between travel cost and the number of visits. A positive relationship is identified between monthly income and the visits; the visits will increase as the income increases. As the number of working members in the family increases, the visits also increase bearing a positive relationship between the variable. Since the number of members in the family increases, the visits decrease and therefore it is negatively related. Other independent variables such as gender, education, and marital status are also negatively related to the dependent variable. Demirbulat et al. (2015) stated that family members spend a pleasant time and strengthen their family ties while traveling with their families. The holiday concept of Turkish people with an orient culture is quite different from the western tourist type with an individualistic culture. In that vein, a significant portion of the Turkish people usually travels with their family (Avcıkurt, 2003: 101; cited in Belber, 2009: 99). Therefore, in this study, as the sample is the domestic tourist, the variables of the number of members in the family, and the number of working members in the family are noticed to be effective and significant in the model.

As a result of the multiple regression analysis in the study, the total consumer surplus-value of Pergamon Ancient City is determined to be 26,741,248,677 TL. Total consumer surplus indicates the economic value of the benefit that total tourists receive from the site. This study will contribute to the literature in terms of determining the economic value of cultural heritage sites. With the increase of similar studies, the value of cultural heritage sites and utilizing the sites for tourism purposes will increase. In the line with similar studies, protecting

the cultural heritage sites, transferring the sites to future generations, and providing sustainability is an inevitable concern for the community embraces the contribution of the study to the field.

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