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Non-market valuation of forest park using travel cost method (case study: Saravan forest park, north of Iran)

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Keywords: Travel cost method, recreational values, consumer surplus, Saravan forest park

Abstract

The aim of this research was to evaluate the non-market products of a forest park in north of Iran. Required socio-economics data were collected using questionnaires. Travel cost method was used to estimate the economics and recreational values. Regression analysis was used to estimate some socio-economics variables on behavior of forest park visitors. The economics and recreational values of forest park calculated via the demand function. The results of regression analysis showed that the variables such as required time to access the site, travel cost, monthly income, age and education effect on visiting people to the forest park. The results showed that there is a

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linear relation between required time to access the park and number of visitors. The results indicated that there is a polynomial relation between the number of visitors and the travel cost. The results of regression analysis showed that there is a third degree polynomial relation between the number of visitors and income. Furthermore, the results of demand function showed that the daily value of recreational site or consumer surplus is 68319800 Iranian Rials. The results of this study can be a powerful tool to improve the quality of environmental services and expand service and infrastructure quality of the study area.

1. Introduction

Nowadays, non-market valuation techniques are increasingly used to evaluate some goods and services that do not command a market price or that the market prices of such goods and services do not correctly match the values of the goods or services. Examples of such goods and services include environmental goods and services such as recreational sites (public parks, forest parks, beaches, zoos, etc.). The continued demand for environmental quality as manifested by outdoor recreation participation coupled with reductions in funding for resource management increases the importance of obtaining reliable measures of relative economic value of environmental resource. The values of outdoor recreation resources are not directly observable in the marketplace (Das, 2013). Non-market valuation is therefore all about seeking ways to ascribe values to such goods and services that are either not traded in the market or whose prices are not fair reflections of their values (Boardman et al., 2006). Placing an accurate and acceptable value on outdoor recreation would be of great help for proper resource management.

Marketable goods and services are valued in terms of their prices, non-market goods, services could be hard to evaluate, and there is not any barging for them in real market. Such goods and services include recreational values, air quality, scenic values, environmental resources and services, etc. There are some methods to evaluate the recreational value and ecosystem services such as Travel Cost Method (TCM), Contingent Valuation Method (CVM), Hedonic Price Method (HPM), benefit transfer, conjoint analysis and choice modeling.

Non-market valuation techniques generally fall in two broad categories such as revealed preference methods and stated preference methods. The revealed preference approach assumes that observed behavior follows from an intrinsic utility maximization process. Thus, observed behaviors are assumed relevant for welfare analysis. Re-

vealed preference is the basis for standard market good valuation and for non-market good valuation approaches such as the hedonic price and travel cost methods. In contrast, stated preference approaches elicit individual valuations through surveys. Note that these techniques are complementary. Revealed preference approaches primarily allow us to measure the value of consumptive uses, while stated preference approaches generally allow us to measure the value of nonconsumptive uses (existence or option values) (Pearce, 2002)

Revealed preference method are applied in situations where certain actions or preferences from individuals provide information good enough to be used to value other goods or services. Revealed preference methods are divided into TCM and HPM.

The TCM was initially suggested by Hotelling (1949) and subsequently developed by Clawson (1959) in order to estimate the values of recreational sites. Therefore, TCM method also called Clawson method. The TCM method is based on actual behavior or what people actually do rather than willingness to pay or what people say they would do in a hypothetical situation. Furthermore, TCM is less costly than the other methods and the interpretation of results are easier than the other methods. TCM is one of the techniques used to estimate the value of recreational sites using consumption behavior in related markets. In other words, this method is a non-market procedure whereby a recreational site value is estimated by considering how much people spend to access the site (travel costs, entry fees, on-site expenditures) and also its consider the willing to pay of the visitors for recreational site. The method assumes weak complementarily between the recreational site and consumption expenditure. This implies that when consumption expenditure falls to zero, the marginal utility of visitation is also zero, or alternately the recreational site will only be valued if consumption expenditure is positive (Hanley and Spash, 1993). The method has become widely accepted and is regarded as one of the success stories of non-market valuation (Smith, 1993).

The theory surrounding the TCM and its application is relatively straightforward. It is grounded in the microeconomic theory of consumer behavior which states that an individual consumer maximizes his or her utility derived from the consumption of goods and services subject to his or her budget constraint (Gravelle and Rees, 2004). The travel-cost method (TCM) estimates willingness to pay, consumer surplus and utility, by the link between environmental assets and markets for related private goods using recreational trip expenditures as a proxy for willingness to pay in demand estimation. It is based on the relationship between visits to a site, in some time,

and a number of other variables determining these visits (Willis and Garrod, 1991a). In order to guarantee an efficient use of common resources, the development of any public policy needs to be preceded by a sound evaluation of its social costs and benefits (Boardman et al., 2001). For this reason, environmental valuation has increasingly been used by managers to assign monetary values to non-marketed benefits as a way of integrating them into benefit-cost analysis and cost effectiveness analysis (Brown et al., 2006; Christie et al., 2006). Public goods and services supplied by nature require active government intervention to ensure their provision (Bestard and Font, 2008).

Outdoor recreation is an activity that increases visitors' relaxation. The demand for outdoor recreation has been increasing with increasing of population. However, natural and financial resource is limited for outdoor recreation. Therefore, it is required to estimate the economic benefit of recreational sites for optimum allocation of scarce resources (Mohammadi Limaei et al., 2014). TCM is a useful and effective method to evaluate the use-value of recreational sites and the purpose of a TCM is to arrive at an estimate of the site's consumer surplus.

Saravan forest park in north of Iran is one of the most highly used and poplar visitor destination of visitors in north of Iran. Therefore, the purpose of this study is using TCM approach to evaluate the non-market values of Saravan forest park in north of Iran. TCM will be used to determine the sociodemographic data about the visitors, the relationship between the number of visits, travel costs and other pivotal variables as well as to determine the demand function. Finally, the value of recreational site or consumer surplus will be determined by calculating the area under the demand curve.

2. Material and Methods

2.1. Study area:

Saravan forest park is located in Guilan province, north of Iran. The area of the forest park is about 1487 ha. This park is located 17 km away from Rasht, center of Guilan province and 300 km away from Tehran. It is one of the most tourist destinations in Rasht township. Facilities such as children playground, parking lot, restaurant, bike paths, hiking trails, rest area and alcove are located in this park.

2.2. Sampling Method:

In order to determine the sample size, 30 preliminary pre questionnaires were used. Then, the variances of questions were determined and the Cochran function was used to determine the required questionnaires (Cochran, 1977). Therefore, 480 samples of visitors were suggested for the survey. The questionnaires were distributed randomly between the visitors in different season (autumn and winter in 2014, spring and summer in 2015).

2.3. Zoning travel cost method:

2.3.1. Zoning the residential regions:

It was assumed that Saravan forest park is surrounded by five different residential regions or zones depending on their distance travelled to the forest park. The required data and information collected via questionnaires. The questionnaire aimed to collect information on the visitors' behavior towards the environmental good or service. The questionnaire had two sections. At the first section, some general questions included such as age, education, income per month, kind of tripe (lonely, with family or with a group), vehicle types to access the recreational site.

Specific questions regarding the recreational value were asked in the second section of the questionnaires such as: number of visits from each zone, demographic information from each zone, distance from each zone, travel cost from each zone, the opportunity cost of travel time, the amount of time spent at the recreational site, quality of the recreational site, attractive natural phenomena at the site, willingness to pay to access the site, etc.

2.3.2. Preparing a questionnaire based on TCM method

In TCM method, demand curve is constructed using the results of the regression analysis in order to estimate the recreational value. The area under the demand curve is the willingness to pay for the recreational site that can be used as a valuation for cost-benefit analysis.

Hence, the questionnaire was prepared taking into all of the factors that can effect on simple relation between the cost per visit to the site and the frequency of visiting. The most important of these factors include the cost of access to the park, income level and the other factors that called economic factors.

The behavior of users for goods and services does not determined just based on cost, because their social and economic situations will affect also on preferring a good. In particular, for using a recreational site, several factors act on choosing users behaviors. Therefore, the questionnaire has been prepared in a manner to cover all of the socio-economic characteristics. The following factors are included in questionnaire:

I. Socio-economic characteristics of people who can use potentially the recreational site

1. Geographical distribution of the recreational site visitors

2. Social profile

a) Age distribution

b) Sex distribution

c) Job distribution

d) Combination of site visitors (group, individual, family)

3. Average income of site visitors

4. Educational level of site visitors

5. Duration of visit

6. Current information of visitors regarding the recreational site and their tastes about preferred recreation

II. Factors and specifications related to recreational site

1. Natural and real attractions of site based on users judges.

2. Availability of substitute sites that the person might visit instead of this site

3. Amount of recreational site facilities and the capacity of the region in terms of users

III. Effective factors in relation between users and recreational area

1. Required time to reach the park

2. Necessary facilities to reach the park

3. Round trip ravel expenses

4. Visitors willingness to pay for entrance fee after providing and improving the service and infrastructure quality of recreational site.

2.4. Demand Function

The demand function is estimated based on relation between distance, travel cost and number of visitors as follow:

$$V_{ij} / N_i = F\left(TC_{ij}, S_{ij}, A_{jk}\right) \qquad (1)$$

V_{ij}: Number of visitors from area i to recreational site *j*
N_i: Total population of area *i*
TC_{ij}: Travel cost from area i to recreational site *j*
S_{ij}: Socio-economic characteristics of people that live in area i and visit the recreational site *j*
A_{jk}: Attractive and aesthetic phenomena of recreational site j in compare to the other recreational site *k* (Willis and Garrod, 1991b).

In addition to the above-mentioned independent variables, Mons (2003) suggested to consider the entrance cost to the recreational sites where this cost exists. Then, the demand function of recreational site can be determined using the Equation (1) and the area of under the demand function that shows the economic value of recreational site. The least square method was used in order to estimate the demand function and to calculate the area of under demand function. In this model, the number of visitors per 10000 populations from each zone was considered as a dependent variable. Furthermore, the average round trip travel cost and three socio-economic variables (age, education and income level) were considered as independent variables. Then, a demand model was determined using the mean value of the three above-mentioned socio-economic variables.

The equation between the average cost and the number of visitors show the visitor behavior against the cost variations. Hence, there was some opportunity for visitors in the questionnaires to choose some different hypothetical entrance fees.

Furthermore, the new ratio of number of visitors for 10000 visitors was calculated by adding the hypothetical entrance fees to the average cost of access to the recreational site and putting these new amounts in the obtained simple demand model. Finally, the area under the demand curve was calculated using the new visitors' ratio and model (2). Hence, the daily recreational value of the forest park was calculated (Willis, 1991).

$$V = \sum_{i=1}^{n} N.AP \qquad (2)$$

Where V is economic value of the recreational site, N is number of visitors and AP is hypothetical entrance fees. Some socio-economic characteristics of visitors such as educational level, age, sex, income, etc. also determined.

3. Results

3.1 Origin of visitors

The results of the questionnaires showed that the highest and lowest number of visitors was from Rasht city (37.71%) and Isfahan city (0.21%), respectively (Table 1). Details of population, number of visitors and percentage of visitors are shown in Table 1.

Table 1: The origin of visitors

Name of city	Number of visitors	Percentage of visitors	Name of city	Number of visitors	Percentage of visitors
Rasht	181	37.71	Ardabil	9	1.88
Astaneh	43	8.96	Khalkhal	3	0.63
Anzali	23	4.79	Tabriz	3	0.63
Fouman	25	5.21	Zanjan	3	0.63
Langarod	16	3.33	Tehran	16	3.33
Roudbar	17	3.54	Karaj	12	2.5
Lahijan	29	6.04	Qazvin	6	1.25
Roudsar	13	2.71	Tonekabon	3	0.63
Sowmeh Sara	32	6.67	Siyahkal	14	2.92
Talesh	17	3.54	Ghom	6	1.25
Astara	7	1.46	Isfahan	2	0.42

3.2. Vehicle

The results of the questionnaire showed that 430 of visitors (89.5%) traveled by their own vehicle, 27 of them (5.6%) by taxi, 10 of them (2.08%) by car, 7 of them (1.45%) by bus, 3 of them (0.65%) by motorcycle and 3 of them (0.65%) walked to the park.

3.3. Travel time to access the park

The results of the questionnaire showed that 298 of visitors have spent less than 1 hour to reach the park, 121 of them between 1-2 hours, 35 of them between 2-3 hours, 10 of them between 3-4 hours and 15 of them more than 4 hours (Table 2).

Table. 2: Time to access the park

	> 1 hour	1-2 hours	2-3 hours	3-4 hours	4< hours
Number	298	121	35	10	15
Percentage	62.08	25.20	7.29	2.08	3.12

Fig. 1. shows the relation between travel times to access the park and number of visitors. Hence, when the travel times to access the park increase the number of visitors decrees.

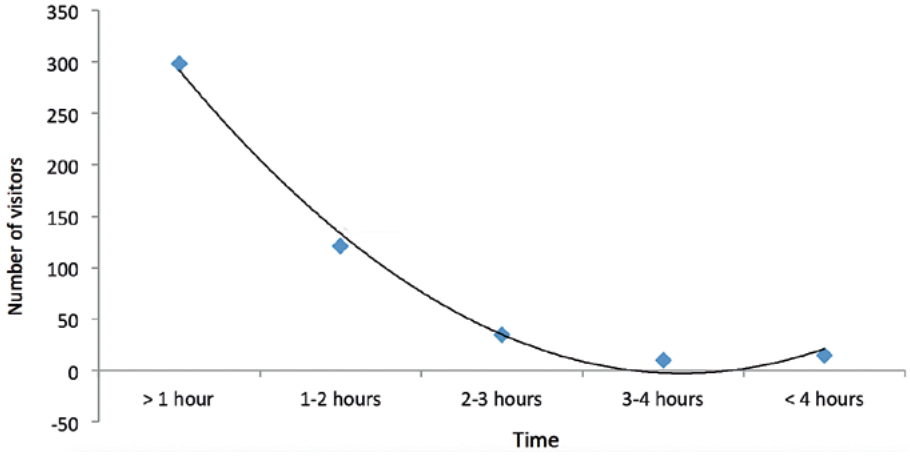

Fig. 1: Relation between time to access the forest park and number of visitors

3.4. Types of visitors:

The results of the questionnaire showed that 279 or 58.12% of visitors are families, 171 or 35.62% of visitors came by a group and 30 or 6.25% of visitors individually visited the park.

3.5. Education of visitors

The results of the questionnaire showed that 81.87% of visitors had academic education. The details of visitors' educational level are as follow: 33.8% of visitors had M.Sc. degree or higher, 29.42% of visitors had B.Sc. degree, 25.6% of visitors had associate degree, 25.31% of visitors had high school diploma degree and 11.88% of visitors had elementary or secondary school degree.

3.6. Number of accompanying persons

The results showed that 826 or 81.29% of accompanying persons were older than 16 years and 253 or 24.9% of them were younger than 16 years.

3.7. Type of road inside the park:

The results showed that 285 of visitors (59.37%) prefer asphalted road, 145 of visitors (30.2%) prefer concrete road and 50 of visitors (10.41%) prefer dirt road.

3.8. Kind of recreation:

Results indicated that 73.95% of visitors prefer to visit park and forest park in case the weather condition is suitable, 12.29% prefer to visit pool and coast, 7.5% prefer to go gym and 6.25% prefer the other kind of healthy recreations.

3.9. Reason to visit the forest park:

Most of visitors (34.16%) declared that the reason to visit the forest park is to get rid of cities noise pollution. The details of reason to visit the site are shown in Table 3.

Table 3: Number of visitors based on the reason to visit the park

	Previous acquaintance	Recommended to visit	Nearby location	To stay away from other parks	Better position for recreation	To get rid of cities noise pollution	To get rid of cities crowd and traffic jam
Number of visitors	159	19	50	17	56	164	15
Percentage of visitors	33.12	3.95	10.41	3.54	11.66	34.16	3.12

3.10. Available welfare facilities inside the forest park:

The results of surveying welfare facilities or service and infrastructure quality in the park such as the number of benches, picnic area, children playground, paths and roads, restrooms, car park, restaurant and food showed that most people were not satisfied with the site facilities. The details of available welfare facilities are shown in Table 4.

Table 4: Visitors satisfaction from available welfare facilities

		Number of benches	Picnic area	Children playground	Paths and roads	Restrooms	Car park	Restaurant and food
Satisfactory	Number	50	32	201	356	83	84	189
	percentage	10.42	6.67	41.88	74.17	17.29	17.50	39.38
Unsatisfactory	Number	430	448	279	124	397	396	291
	percentage	89.58	93.33	58.13	25.83	82.71	82.50	60.63

3.11. Round trip travel costs:

Results show that 52.29% of visitors spent less than 30 thousand IRR to visit the site and 26.11% of them spent more than 1500 thousand IRR (Table 5). The details of round trip travel costs to visit the site are shown in Table 5.

Table 5: Travel costs per person of visitors.

	> 300 thousand IRR	300-600 thousand IRR	600-900 thousand IRR	900-1200 thousand IRR	1200-1500 thousand IRR	1500< thousand IRR
Number	251	70	50	29	33	47
percentage	52.29	38.89	27.78	16.11	18.33	26.11

3.12. Cost spent during the residence time in the park:

The results showed that 191 visitors spent less than 200 thousands IRR during their stay in the park and 24 of them spent 800-1000 thousand IRR (Table 6).

Table 6: Costs spent inside the park

	>200 thousand IRR	200-400 thousand IRR	400-600 thousand IRR	600-800 thousand IRR	800-1000 thousand IRR
Number	191	170	64	31	24
Percentage	39.79	35.42	13.33	6.46	5.00

3.13. Monthly income of visitors:

Results show that 31.46% of visitors had income between 10-20 (million IRR) and this range of income related to the people with average income in Iran. The poor people with income of less than 5000 thousand IRR had lower frequency (7.92%) to visit the site (Table 7).

Table 7: Visitors monthly income.

	> 5 million IRR	5-10 million IRR	10-20 million IRR	20-40 million IRR	40< million IRR
Number	38	125	151	106	60
Percentage	7.92	26.04	31.46	22.08	12.50

3.2. Regression analysis:

3.2.1. Regression equation between the number of visitors and the required time to access the park

Regression analysis was used to investigate the effect of the required time to access the park on the number of visitors. The results showed that there is a linear relation (Equation 3) between the number of visitors as a dependent variable and the required time to access the park as an independent variable. The P value show that the relation is significant at significance level of 0.05 (Table 8).

$$Y = \alpha + \beta X \qquad (3)$$

Where, Y is the dependent variable (number of visitors), X is independent variable (required time to reach the park) and α, β are the estimated parameters by regression analysis.

Table 8: Parameter values of regression analysis between the number of visitors and the required time to access the park

	Coefficients	Standard error	t statistic	P value
Intercept	298.9	69.76458	4.284409	0.023365
X Variable	-67.7	21.03481	-3.21847	0.048641

3.2.2. Regression equation between the number of visitors and travel cost

The results showed that there is a second order polynomial equation between the number of visitors as a dependent variable and the travel cost as an independent variable. The coefficient of determination was R^2= 0,93 (Fig. 2). The linear regression was not significant between the two above-mentioned variables at the significance level of 0.05.

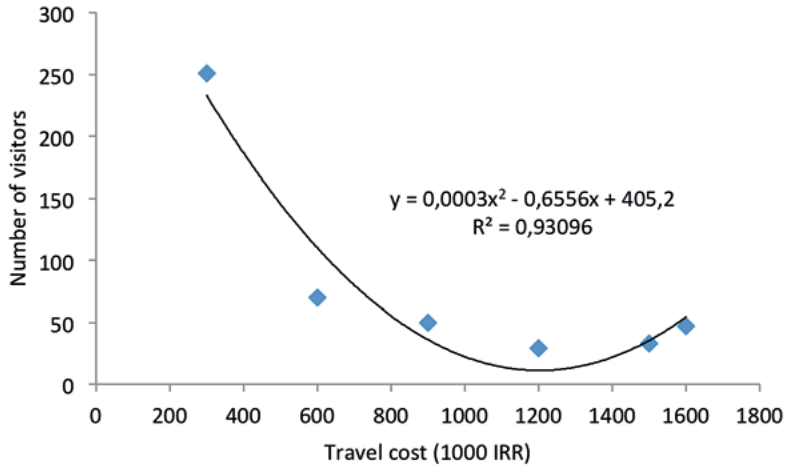

Fig. 2: Relation between the number of visitors and travel cost

3.2.3. Regression equation between the number of visitors and the income of visitors

Regression analysis was used to investigate the effect of visitors' income on the number of visit to the site. Results showed that the best equation between two variables is a third order polynomial equation with coefficient of determination (R^2= 0,98) (Fig. 3).

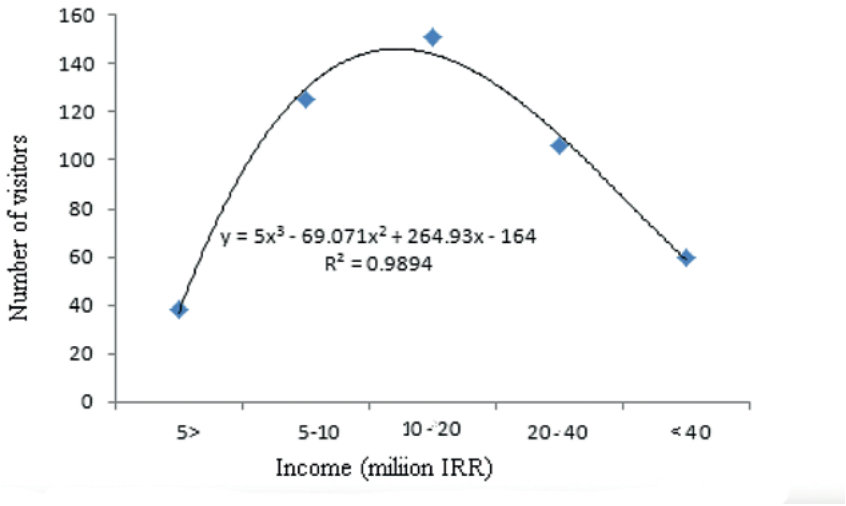

Fig. 3: Relation between the number of visitors and the visitors' income

3.3. The recreational value

The result of recreational value of Saravan forest park is shown in Table 9. The Table shows the variables from questionnaires per origin of visitors such as number of visitors per 10000 population, average number of visitors, average travel cost, average monthly income, average education and average age.

Table 9: Values of variables from questionnaires analysis in Saravan forest park

Zone	Population	Number of visitors	Number of visitors per 10000 population (VR)	Average number of visitors	Average travel cost (TC) IRR	Average monthly income (I) IRR	Average education (E) (Year)	Average age (A) (Year)
1	1292561	295	6146	0.004754772	164550	8435000	13.51	30.9
2	545048	85	1771	0.003248949	227850	9055000	13.3	32.8
3	334299	54	1125	0.003365251	275700	8392000	13.5	32.9
4	616294	30	625	0.001014126	387690	10350000	14.2	40.5
5	72361467	16	333	4.6065E-06	475730	11350000	14.4	35.4

As it mentioned before, the economic and recreational values of Saravan forest park calculated via the demand function. The regression equation of this function was estimated for the forest park as below:

$$VR = EXP\left(-0.03964TC + 7523.496E - 263.901A + 0.000345I - 83733.8\right) \quad (4)$$

Where *VR* is number of visitors per 10000 population of each zone, *TC* is round trip travel cost, *E* is education, *A* is age and *I* is monthly income.

In Equation (4), the number of visitors per 10000 populations was considered as dependent variable, the average round trip travel cost and socio-economic variables (age, education and income level) were considered as independent variables. The simple demand model was determined using the mean value of the three above-mentioned socio-economic variables. The standard error of the estimated coefficients of these regression equations was not greater than 0.001. Furthermore, via inserting average amounts of the independent variables such as age, education and monthly income into Equation 4, the simplified version of it was calculated as below (Equation 5):

$$VR = EXP(-0.03964TC + 14118.55) \quad (5)$$

The area under the demand curve or daily value of recreational site was calculated using Equation (2) and Fig. 4. This value also called consumer surplus, as it is the monetary value of the recreational site. Results show that the daily value of the recreational site is 68319800 IRR.

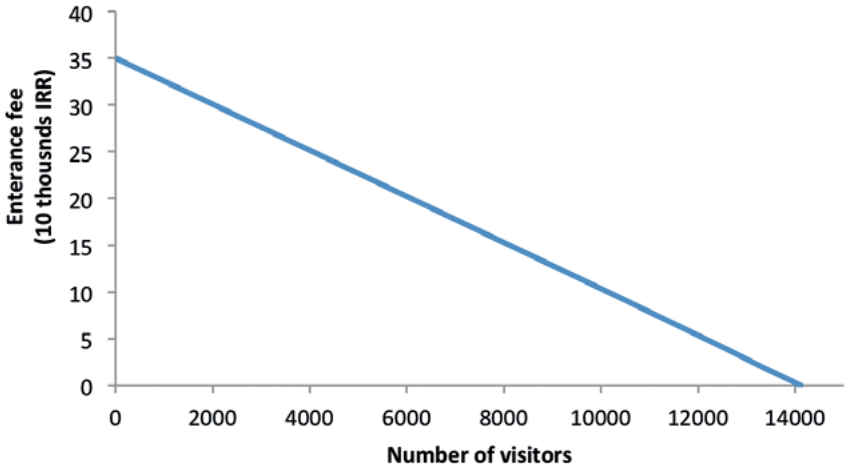

Fig 4: Rrecreational demand curve of Saravan forest park in city

4. Discussion:

The aim of this study was to determine the recreational value of Sravan forest park in north of Iran. Therefore, the monetary value of the recreational site was estimated using TCM. The monetary value of the recreational site is consumer surplus from the estimated demand function. The basic premise of the travel cost method is that the time and travel cost expenses that people incur to visit a site represent the "price" of access to the site. Thus, peoples' willingness to pay to visit the site can be estimated based on the number of trips that they make at different travel costs. This is analogous to estimating peoples' willingness to pay for a marketed good based on the quantity demanded at different prices (Nandagiri, 2015). It is necessary to estimate the benefits of recreational sites in order to consider the importance of the implementation of tourism development plans in recreational sites. The results of this study showed that the variables such as required time to access the park, travel cost, monthly income, age and education effect on visitors usage from Saravan forest park.

Utpal and Amrita (2011) estimated the recreational benefits by both TCM and CVM for Cherrapunjee, India. They examined that travel distance and travel cost had significantly negative impacts on the frequency of visit while education and income had positive impact on the individual visit. Results of this study showed that there is a linear relation between required time to access the park and number of visitors

whereas the required time to reach the forest park increases, the number of visitors decreases. The result on the effect of required time to access the recreational site and number of visitors is similar to previous research such as Wieland and Horowitz (2007), Liu and Lin (2014) and Mohammadi Limaei et al., 2014. The results showed that there is a polynomial relation between the number of visitors as a dependent variable and the travel cost as an independent variable. This means that increasing travel cost caused to reduce number of visitors or with increasing distance from the park, the number of visitors would decrease. This result is similar to the findings from Mojabi and Mansori (2005), and Pirikiya (2016). The regression analysis showed that there is a third order polynomial equation between the number of visitors as a dependent variable and income as independent variables. The result on the effect of income on trip frequency is in line with findings from previously researches on the subject such as Chae et al. (2011), Ezebilo (2016) and Pirikiya (2016). The recreational value of Saravan forest park estimated based on the demand function. The results show that the daily value of recreational site is 68319800 IRR.

The largest number of visitors in this study had academic education (81.87%). This result may show that the higher education is an important factor for recreational site attention and attraction.

The level of education relates directly with income amount and with increasing level of education the leisure opportunities increases (Shrestha et al., 2002). Results showed that the largest number of visitors (37%) belongs to age group of 31-40 years old. The reason could be lack of available welfare facilities in recreational site, especially for the age groups less than 20 years old and more than 50 years old. Mohammadi Limaei et al (2014) showed that the largest number of visitors had academic education and two middle ages (31-50) classes have the highest visitors in Masouleh forest park, north of Iran.

It is important to have information about the visit frequency from recreational sites in order to estimate the number of visitors and duration of visit. This information is useful for planning and allocating the available recreational facilities at the site (Beal, 1995). This study showed that 84.17% of visitors visited the recreational site for several times and indicate that the study area is attractive for tourist. Hence, in the future more facilities are required to meet this high amount of demand. The results showed 59.79% of visitors stay in park for half a day (6 - 12 hours). The results of questionnaires showed that the largest number of visitors (31.42%) have monthly income between 10 to 20 million IRR, 7.92% of them have monthly income less than 5 million IRR and 16.46% of them have the monthly income more than 40 million IRR. This results show that people with middle income willingness to visit the forest park more than the other groups.

5. Conclusion

The TCM asks visitors for their willingness to pay hypothetical fees to enter a recreational site. The designing and distribution of questionnaires between the visitors is important stages in TCM method to determine the recreational site with precious estimation. Otherwise, with lower precious in data collection, the results can led to over estimation or lower estimation. Improving of facilities from visitors' point of view can increase the number of visitors to visit the recreational site. The results of this study may provide more understanding of the distribution of benefits and costs associated with recreation in the study area. Eventually, the finding of this research can help ecosystem managers for land use planning in designing a sustainable recreation strategy.

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References:

Beal. D. 1995. A travel cost analysis of the value of Carnarvon Gorge National Park for recreational use'; Reprise, The Australian Journal of Agriculture and Resource Economics, 42(3): 267-268.

Bestard A. B. and Font, A. R. 2008. Estimating the aggregate value of forest recreation in a regional context. Centre de Recerca Econ`omica, Ctra., Spain, 25pp.

Boardman A. E., Greenberg, D. H., Vining, A. R., and Weimer, D. L. 2001. Cost-benefit analysis: concepts and practice. New Jersey: Prentice Hall.

Boardman A.E., Greenberg, D.H., Vining, A.R. and Weimer, D.L. 2006. Cost-benefit analysis: concepts and practice (3rd ed.). New Jersey: Pearson Prentice Hall.

Brown T. C., Bergstrom J. C., and Loomis J. B. 2006. Ecosystem Goods and Services: Definition, Valuation and Provision. Fort Collins, CO: Rocky Mountain Research Station.

Chae, D., Wattage, P., Pascoe, S. 2011. Recreational benefits from a marine protected area: A travel cost analysis of Lundy. Tourism Management, 33: 971–979.

Christie M., Hanley N., Warren J., Hyde T., Murphy K., and Wright R. 2006. Valuing changes in farmland biodiversity using stated preference techniques. In D. Pearce (Ed.),

Environmental valuation in developed countries. Cheltenham, UK: Edward Elgar.

Clawson M., 1959. Methods of measuring demand for and the value of outdoor recreation. U.S. Resources for the Future. Reprint No. 10.

Cochran W.G. 1977. Sampling Techniques, New York, John Wiley & Sons, 428 pp.

Das S. 2013. Travel cost method for environmental valuation. Madras School of Economics Chennai, India. Dissemination paper-23, 17 pp.

Ezebilo E.E. 2016. Economic value of a non-market ecosystem service: an application of the travel cost method to nature recreation in Sweden. International Journal of Biodiversity Science, Ecosystem Services & Management. Published online (http://dx.doi.org/10.1080/21513732.2016.1202322), 314-327.

Nandagiri L. 2015. Evaluation of Economic Value of Pilikula Lake Using Travel Cost and Contingent Valuation Methods. Aquatic Procedia, 4:1315–1321.

Gravelle H. and Rees R. 2004. Microeconomics, 3th edition, Pearson Education Canada, 752 pp.

Hanley N. and Spash C. 1993. Cost benefit analysis and the environment. Edward Elgar. Cheltenham, UK.

Hotelling H. 1949. Letter, In: An Economic Study of the Monetary Evaluation of Recreation in the National Parks. Washington, DC: National Park Service.

Liu W.Y., Chiou, C.R. and Lin, J.C. 2014. Application of the travel cost method to measure the urban forest park's recreational value with first-visit satisfaction taken into account. Journal of Food, Agriculture & Environment,12 (2): 1013-1024.

Mojabi S., Mansori M. 2005. The economic evaluation of Pardisan and Lavizan Parks. Environment Sciences, 7: 63–72.

Moons, E. 2003. The development and application of economic valuation techniques and their use in environmental policy – A survey, KU Leuven, Belgium, Working paper, 34 pp.

Mohammadi Limaei, S., Ghesmati, H., Rashidi, R., Yamini, N. 2014. Economic evaluation of natural forest park using the travel cost method (case study; Masouleh forest park, north of Iran). Journal of Forest Science, 60 (6): 254-261

Pearce, D. 2002. An Intellectual History of Environmental Economics, Annual Review of Energy and the Environment, 27: 57 - 81.

Pirikiya M., Amirnejad H., Oladi J., Ataie Solout K. 2016. Determining the recreational value of forest park by travel cost method and defining its effective factors, Journal of Forest Science, 62(9): 399–406.

Shrestha R.K., Seidl A.F. and Moraes A.S. 2002. Value of recreational fishing in the Brazilian Pantanal: a travel cost analysis using count data models. Ecological Economics, 42: 289–299.

Smith, V. K. 1993. Nonmarket valuation of environmental resources: an interpretive appraisal. Land Economics, 69(1):1-26.

Utpal K. D. and Amrita D. 2011. Valuing Recreational and Conservational Benefits of a national tourist site: Case of Cherrapunjee. Journal of Quantitative Economics, 9(2): 154-172.

Wieland R.C and Horowitz J. 2007. Estimating the Recreational Consumer Surplus at

Maryland's. Harry R. Hughes Center for Agro-Ecology. University of Maryland, 27 pp.

Willis K.G. 1991. The recreational values of forestry commission estate in Great Britain: A Clawson-Knetsch travel cost analysis Scottish. Journal of Political Economy, 38: 58-75.

Willis K. G., and Garrod G. D. 1991a. Valuing open access recreation on inland waterways: On-site recreation surveys and selection effects. Regional Studies, 25(6), 511–524.

Willis K. G., and Garrod G. D. 1991b. An individual travel cost method of evaluating forest recreation. Journal of Agricultural Economics, 41, 33– 42.