

PUBLIC PARK VALUATION USING TRAVEL COST METHOD

Pawinee IAMTRAKUL
Doctoral Student
Department of Civil Engineering
Saga University
1 Honjo, Saga,
840-8502, Japan
Phone: +81-952-28-8830
Fax: +81-952-28-8699
E-mail: iamtrakul@gmail.com

Kardi TEKNOMO
Lecturer
Institute of Lowland Technology
Saga University
1 Honjo, Saga,
840-8502, Japan
Phone: +81-952-28-8830
Fax: +81-952-28-8699
E-mail: teknomo@gmail.com

Kazunori HOKAO
Professor
Department of Civil Engineering
Saga University
1 Honjo, Saga,
840-8502, Japan
Phone: +81-952-28-8519
Fax: +81-952-28-8699
E-mail: hokao@cc.saga-u.ac.jp

Abstract: Public parks as representative of urban green areas have played an excellent role to against degradation of urban environment while keeping the rapid pace of urban growth. Development, maintenance and preservation of the quality of public park service, however, are tough issues faced by many city governments and communities. An approach to valuate public park services is necessary well established to identify users' benefit through travel cost method together with total expense. This approach highlights the dominant functions of public parks from users' point of view. A case study was done to investigate recreation behavior of park users in Saga city, Japan. Furthermore, the result showed a useful issue that plays a significant role in generating valuable economic information for local government policymakers to place suitable management plans in maintaining quality of public park service in association with the preference of community to achieve the goal of livable city.

Key Words: travel cost method, park users' benefit, public parks

1. INTRODUCTION

Public parks as representative of urban green areas have played an excellent role that balances the needs for city conservation against degradation of urban environment while keeping the rapid pace of urban growth (Wooley, 2003). In recent years, the urbanization of many cities advance the need for green space in the community to serve people in multiple objectives of environmental protection, recreation, and to meet people's ability to incorporate physical activity into their daily routines. However, development, maintenance and preservation the quality of public parks service are tough issues faced by many city governments and communities. It needs significant political rather than economic valuation due to the complexity to put the public park services into users' benefit. On the other hand, it is not straightforward to cope with this problem since this kind of public service, by definition, does not require direct fee from the visitors. Therefore, it is necessary to establish a new method to valuate the public park services based on users' benefit through an approach that called travel cost method.

The method highlights the dominant functions of public parks from a users' point of view such that it would become a useful technique of public park service valuation. In order to assess the existing benefits of public parks, investigation on park users' behavior to infer economic value on travel expense to consume public good is employed. The travel cost method is then utilized to estimate the recreational benefit based on economic value of public park visitation. To verify the suitability of the proposed framework, a case study was done to investigate recreation behavior of park users in Saga city, Japan. The recreation demand in parks based on the travel cost method was also identified through this study.

The analysis finding indicated that the majority of park visitors who drive to parks compensate their recreation time with a high expense. However, the car users of park visitors also spend longer time to perform recreation activity at parks. An indirect value of estimation of park users' benefits has been done through an evaluation of recreation expenses based on individual and group preference approach. It corresponds to the integration of travel expenditure incurred in getting to the site and the expense on recreation activity at parks. As expected, the result pointed out that the more attractiveness of park induced to the higher benefit value. This result happens due to the willingness for traveling to consume park services. The assignment of monetary value also demonstrates an intuitive appreciation for environmental valuation based on park visitors' preference. This result showed a useful issue that plays a significant role in generating valuable economic information for local government policymakers to place suitable management plans in maintaining quality of public park service in association with the preference of the community to achieve the goal of livable city. It also can be a useful technique to assist public agencies in planning multiple uses of public lands and prioritize the budget based on benefit value compared to other kind of public facilities.

The structure of this paper is organized as follows. In the following section, the suggested method for value recreation benefit to users from public park visitation is presented and the relevant literature is reviewed in the next section. Following that, a method for data collection and the study area are explained in details. The main concepts of this study are subsequently applied by utilizing the collected data from survey and illustrated in this section. Then, the implication of result from analysis is enlightened in this section. Finally, the conclusion of this study is concluded and discussed for future research.

2. BACKGROUND OF STUDY

Although, in recent years the local government has identified tourism and recreation as dominant functions of the region, there has been a tendency for business and policymakers to place more weight on short- term direct economic benefits of development over the longer term benefits that are associated with recreational use (Chen et al., 2004). However, a key reason for the discounting of recreational benefits is that it is concerned with nonmarket public goods that provide to community with no service charge. As such, it is difficult to evaluate their economic value.

Numerous attempts have been made to quantify the benefits derived by visitors to parks and other recreational sites (such as beaches, parks and heritage site) (Liston-Heyes and Heyes, 1999). This measurement is necessary for park management program to identify the cost and benefit in monetary term. Since the information that useful for input into policy design and helping guide management is the issue of numerical term that is tangibly perceive and clearly

be evidence for planning. In order to value recreational benefit in a case study of public parks, traditionally, empirical application of travel cost recreation method is employed. Since the useful of this method is performed as an indirect technique for estimating user benefits from visits to recreational sites such public parks. This well-used tool for nonmarket valuation could place a value on public goods by using consumption behavior in related markets.

Travel cost method or TCM is an indirect method used for estimating user benefits from visits to recreational sites (such as beaches, parks and heritage site) (Liston-Heyes and Heyes, 1999). By using this method, the expenditure related to recreation travel would be treated as travel costs as an accounting an aggregation of out of pocket costs associated with distance traveled and value of time spent traveling (Englin and Shonkwiler, 1995). As well as this expenditure incurred in getting to the site would be as a surrogate for the “price” paid by that visitor for that site’s use. This allows for the estimation of a demand function as well as the estimation of consumer surplus of recreation sites and activities by calculating the area below the demand function and above the implicit price (Freeman, 1993). However, this approach also contain some weakness points depend on the approach to estimate the benefit (Whitehead et al., 2000). Despite the various practical and theoretical problems in this method, it remains a popular technique in estimating the benefits from a particular outdoor recreational site.1

In this paper, we utilize travel cost methodology in an attempt to estimate the economic value of a public park in Saga city, Japan to be as a case study by applied the alternative of the individual method. Since it was studied that the different characteristics of this kind of public space affects different individual’s patterns of activities, the modes and frequencies of utilization (Iamtrakul et al., 2004). The individual perceived the value of public parks in different way due to their personal characteristics, such as age, income, education and past experience of using public park service and the different attractiveness and accessibility of park also resulted to the different value of park benefits from different patterns of public park utilization. Therefore, the different value on different park can be very useful information to guide local planning agency to locate suitable plan for current and future policy for public park service improvement and to enhance the quality of life of the community.

3. THE SURVEY

It is necessary to perform case study on different accessibility and different attractiveness of destination affect on different travel behavior of park users. To support the usefulness of methodology of this study, field survey and personal interview survey was conducted on three park locations as the representatives of public parks in this city as depicted in Figure 1. The survey used random sampling interview park visitors while they enjoyed leisure time on recreation activity at park during spring of 2004. The description of each park is explained as follows:

Saga Castle Park: This park is located in the center of Saga city. It contains museum and library inside the park. Large moat of Saga Castle is located near to the park that is considered as a historical place. These facilities provide a sense of civic pride and may be fostered through the historic and social or horticultural value of individual or community places attributes to the community.

Kono Park: It is located within the central city and it comprises of historical place that a tea house originated from Nebashima's villa. Furthermore, the facility inside also includes play ground, amusement park facilities for children, and a zoo that users can enjoy their recreation time and relax themselves. This park becomes more popular recreation spot for the people of Saga City during spring season due to the available of cherry trees make it more attractive than other park. There are also monuments with selections from the works of Miyachi Karoku and Kakashima Airo, and a bronze statue of famous Eto Shimpei.

Shinrin Park: The allocation of this park is at the outskirts of city limit .There are a variety of trees and shrubs planted in this park and huge children's playground facilities, a memorial hall, and a marker commemorating the arrival of the Buddhist priest Ganjin. This park attract a lot of users for both indoor and outdoor activities groups since there is the largest turf lawn in the prefecture and the prefectural baseball park was built here. A range of outdoor activities such as walking, cycling, running, etc can be enjoyed by a large numbers of people that is to promote physical health of users and social fabric of the nation.



Figure 1. Three Public Parks, A Case Study of Saga City (Japan)

4. CASE STUDY OF PUBLIC PARKS IN SAGA CITY, JAPAN

4.1 Data

Questions regarding the park users' socioeconomic characteristics, recreational travel characteristics and characteristic of activity at park were used in an attempt to value public park benefit. Visitors were approached at random, and a total of 289 effective questionnaires were utilized for further analysis. Consequently, the important variables that extracted from the survey are summarized in Table 1.

Table 1. The Summarization of Variables Effect on Park Visit

Variable	Park Location (n=289)					
	Saga Castle Park (n=96)		Kono Park (n=97)		Shinrin Park (n=96)	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Users Characteristics						
Age (year)	36.56	17.20	36.55	15.30	28.07	9.85
Income (yen)	142,708.33	141,974.64	182,474.23	160,572.10	115,104.17	128,169.25
Travel Characteristics						
Travel time (min)	15.50	14.80	21.90	19.50	26.83	19.28
Travel distance (km)	3.77	10.11	8.28	13.84	10.71	11.20
Travel cost (yen)	58.33	183.91	101.75	193.78	167.19	264.43
Activity Characteristics						
Activity Expense (yen)	156.98	271.57	409.38	864.19	295.52	552.03
Activity time (min)	96.47	75.97	105.26	98.79	106.88	66.70
No.visit / Year	30.70	19.67	22.99	19.65	17.91	18.82
WTP	374.48	438.06	431.96	464.20	342.50	397.96

The survey data indicated that there are the differences in mean value of users' characteristics variables. Since different users have different preference to select park for their visits. On the other hand, for travel characteristics that can be used as a representative of accessibility to park, data collected is clearly resulted on different pattern of recreational trip to different destinations. It can be seen that each park has their individual characteristics. Therefore, the result on travel time, travel distance and travel cost on recreational behavior are demonstrated in their average value. We found that park users spent time to visit Shinrin park approximately 1.7 times and 1.2 times more frequent than Saga Castle Park and Kono Park. The same trend for travel distance, visitors took longer distance to travel to Shinrin park than others that was about 2.8 times and 1.3 times as much as Saga Castle Park and Kono Park. This fact might influence on travel cost incurred on travel to park since it could be implied that the longer distance resulted to the higher expense to park users. The cost generated from transportation to park has direct relationship with travel distance and travel time. It shows that the expense for travel to Shinrin park was in average more than Saga Castle park (2.9 times) and Kono Park (1.6 times).

However, the activity characteristics of park in different place are diverse. Our calculations indicated that park users spend their activity slightly different ways. The money for activity reflects much dissimilar about 1.9 times and 1.4 times for Shinrin park compared to Saga Castle park and Kono park, respectively. The various pattern of activity inside park is also clearly confirmed by the frequency of the visits. It shows that the more accessibility of park location result to more number of visits. Users tend to visit Saga Castle park more than Kono

park and Shinrin park about 1.3 times and 1.7 times, correspondingly.

According to this statistical information, it can be used to support the necessary of investigation of park benefit perceived by users. Since there should be some characteristic of park users influence choices of park selection in different way. The investigation result can be very useful information to guide the local planning agency to locate suitable plan for current and future policy for public park service improvement. The conceptual framework of this study is demonstrated in Figure 2.

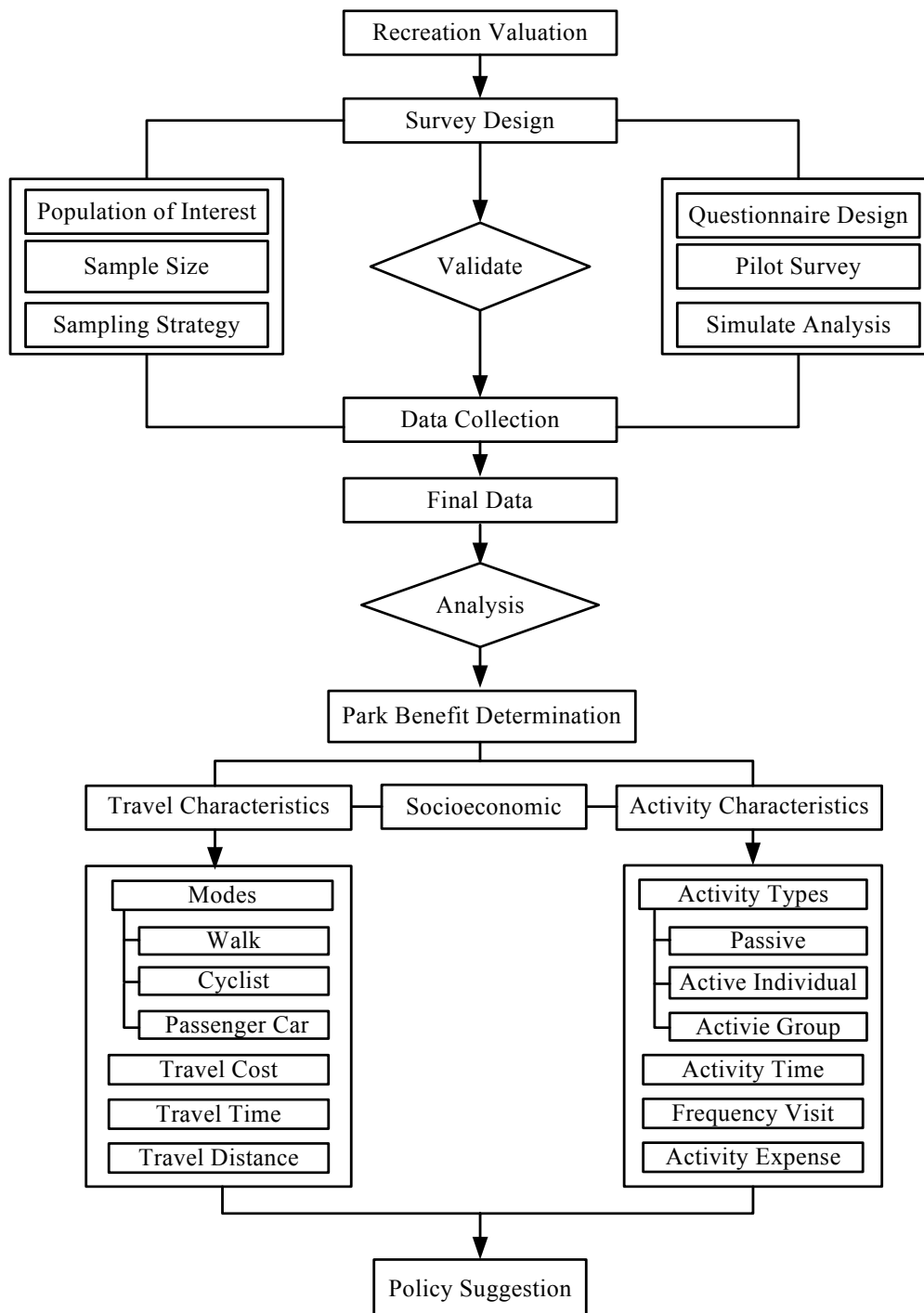


Figure 2. Conceptual Framework of Public Park Valuation

4.2 Travel Cost Method

This study employed travel cost method together with other expenditure to identify the value of park benefit to users. Since the benefit accumulated from total expenses and time spend for both traveling and perform activity at park. This study integrate the traditional method on travel cost valuation together with other expenses to reflect total benefit generate at site visitation. However, it is necessary to assume that users select one site rather than multiple sites to visit on any one trip. By this assumption, it can allow us to determine value of both incur travel costs for the actual trip to park and the actual cost incur on actual activity carry out at park.

The assumption includes the value of on-site time that has similar concept to the well known value of time. The valuation of recreation benefit based on travel for public park case is determined by using the following equation.

$$B = (\alpha + \beta B^{TT} + \gamma B^{TC}) \quad (1)$$

Where:

$$\begin{aligned} B &= \text{Benefit from travel to park (yen)} \\ B^{TT} &= \text{Benefit from travel time value (yen)} \\ B^{TC} &= \text{Benefit from travel cost value (yen)} \end{aligned}$$

The parameters α , β and γ are given to cover up the possible inconsistency values for both time to travel as well as the travel expenditure to park. However, for the value of time, this study used λ to be a representative of unit time value that will be used for both travel time and activity time valuation. The separation of benefit from travel time and travel cost can be demonstrated as in equation (2) and equation (3).

$$B^{TT} = \lambda TT \quad (2)$$

Where:

$$\begin{aligned} \lambda &= \text{Value of time (yen/hour)} \\ TT &= \text{Travel time to park (hr)} \end{aligned}$$

$$B^{TC} = \gamma TC \quad (3)$$

Where:

$$TC = \text{Travel cost value (yen)}$$

By substituting all derivation to equation (1), the monetary term of recreation benefit from travel to public parks in general term can be obtained.

$$B = (\alpha + \beta \lambda TT + \gamma TC) \quad (4)$$

On the other hand, by using rational decision, users who spend longer time to travel and travel expenditure should tend to spend more time and cost in their activity inside parks. Nevertheless, it is not always the case that some users will always have their rational choice. This study employed this rational relationship to purpose the unconventional method to describe the behavior of park users by using monetary term based on the travel cost, travel time, activity time and activity cost. To capture the real park users' behavior, the benefit value that was already given explanation above should be converted to the terminology of spending

based on the relationship of behavior of park users that was given an explanation already. Let total spending for travel is denoted by TS :

$$TS = TC + \lambda.TT \quad (5)$$

The total spending on the activity in the park is also denoted by

$$AS = AC + \lambda.AT \quad (6)$$

where

AC = Activity expenditure on park (yen)

AT = Activity time perform at park (hr)

However, there should be some boundary that there is no different on the benefit to users generated from recreational travel and activity. It means that at that frontier users would obtain same amount of benefit from traveling and perform activity at park. Therefore, this study attempted to determine the threshold when there is no different in spending on both travel and activity. Thus ρ is described to represent the multiplication factor of relationship between spending on travel and activity, this relationship can be written as follows:

$$TS = \rho.AS \quad (7)$$

or

$$TS - \rho.AS = 0 \quad (8)$$

or

$$\rho = \frac{TC + \lambda.TT}{(AC + \lambda.AT)} \quad (9)$$

By using this relationship and combining this idea with travel benefit approach, we can compare the value of ρ for different modes and travel distance to the park. The following equation presents the benefit comparison between car and walking mode to parks.

$$B = \alpha + \beta B^{TT} + \gamma B^{TC} = \alpha + \beta.\lambda.(TT_c - TT_w) + \gamma.TC_c \quad (10)$$

Now with the existing of activity, the travel benefit becomes a burden to the user and benefit of activity becomes an advantage from user point of view. Thus, the total spending for travel is now equal to the benefit for travel, or

$$TS = \alpha + \beta.\lambda \left(\frac{d}{v_c} - \frac{d}{v_w} \right) + \gamma.TC_c \quad (11)$$

Then the indifferent factor between car and walk become

$$\rho = \frac{\alpha + \beta.\lambda \left(\frac{d}{v_c} - \frac{d}{v_w} \right) + \gamma.TC_c}{(AC + \lambda.AT)} \quad (12)$$

To include the speed factor of the car, then equation (13) can be obtained

$$\rho^{wc} = \frac{\alpha + \beta \cdot \lambda \cdot \left(\frac{d}{v_c} - \frac{d}{v_w} \right) + \gamma \cdot TC_c}{(AC + \lambda \cdot AT)} \quad (13)$$

For the indifferent factor of the remaining modal comparisons that are cyclist and car as well as walking and cyclist, the relationship can be illustrated as equation (14) and equation (15), respectively.

$$\rho^{bc} = \frac{\alpha + \beta \cdot \lambda \cdot \left(\frac{d}{v_c} - \frac{d}{v_b} \right) + \gamma \cdot TC_c}{(AC + \lambda \cdot AT)} \quad (14)$$

$$\rho^{wb} = \frac{\alpha + \beta \cdot \lambda \cdot \left(\frac{d}{v_b} - \frac{d}{v_w} \right)}{(AC + \lambda \cdot AT)} \quad (15)$$

However, the real data is required to prove with the numerical example from real data collection at different public parks in Saga city to verify the usefulness of this integrated approach with travel cost method. Since two main variables to compare namely the indifference factor of activity and travel, ρ and distance to park, d are available to utilize in the investigation of relationship between users' recreation experience generated by trips to the perform activity on park site.

5. RESULTS OF ANALYSIS

The analysis presented here is based upon the results of a visitor survey conducted at three different parks at Saga city, Japan that mentioned in the previous section. A total of 289 useful questionnaires were obtained from interview on site in three parks. It was collected during the park users' visitation. As carried out, the sample was distributed in the following ways: location (32.2% Saga castle park, 32.6% Kono park, 32.2% Shinrin park) and day of week (20% weekday, 80% weekend) as shown in Table 2.

Table 2. Distribution of samples classify by park location and day of visit

Park Location	Day of visit		Total
	Week day	Weekend	
Shinrin Park	43	53	96
Saga Castle Park	19	77	96
Kono Park	51	46	97
Total	113	176	289

In order to investigate the relationship between activity and travel distance to park, the parameters in equation (12) need to be calibrated using data on travel time and travel cost.

Along with this calculation, value of time (yen/hour) λ was determined directly from the socioeconomic variable on users' income. This number obtained from the assumption of total working hour per month that was assumed to be 160 hour per month. So that, the value of λ for this study is equal to 918.04 yen per hour and the other parameters were calibrated by using linear regression model. The model represents the high coefficient of determination of R^2 on 0.866 and adjusted R^2 is 0.865. All of explanatory variables are positive statistically significant at 5% level of confidence. The value of estimated coefficients can be described as in Table 3.

Table 3. Coefficient of Travel Time and Travel Cost

Explanatory Variable	Unstandardized Coefficients		t-Statistic	Sig.
	Parameter	Std. Error		
Constant, α	168.893	12.060	14.005	.000
Travel cost (yen), γ	1.287	.058	22.143	.000
Travel time value (yen), β	.373	.026	14.281	.000

By utilizing these parameters estimation, the distance and activity factor, ρ can be determined. However, before reaching the result of calculation for this factor, it was found that there were many activities that users performed at parks from the survey data. The transportation means also effect parks user's behavior and destination choice selection. Therefore, this study classified the main analysis into two parts that are park activity and mode of transportation to park.

5.1 Users' Pattern of Activity at Parks

This study categorizes the different activities in park into three main categories that are passive activity, active individual activity and active group activity. Following that, in general, a variety of activities can be grouped to be three types of activities that can be described as follows:

Table 4. Definition of Activity

Activity	Description
Passive Activity	<i>Definition:</i> Activity for providing relaxation and recreation or enhancing socializing to performer <i>Example:</i> meeting friends, looking after children or view, reading , photography, conversation with stranger, resting, etc.
Active Individual Activity	<i>Definition:</i> Activity involve in a range of sporting activity include both indoor and out door activity that perform individually <i>Example:</i> running, jogging, walking, cycling, skateboarding, etc.
Active Group Activity	<i>Definition:</i> Activity involve in a range of sporting activity include both indoor and out door activity that perform in team or group of performers. <i>Example:</i> soccer, basketball, football, valley ball, badminton, etc.

Users could perform various activities inside parks; therefore, the multiple activities could be undertaken. To perform the analysis, classification of different activity needs to be tested to determine whether the means of different category in the same variable are different or not using the analysis of variance (ANOVA) of analysis. The test statistics in a single-factor ANOVA, *F* test results to all variables reject null hypothesis at significance level 0.05. It represents that means of different activity groups differ from one another that would be useful variable to discriminate group of analysis. The result of calculation for the distance and activity factor, ρ in different categories of activity performed at parks and its ANOVA test for different activity can be demonstrated as shown in Table 5 and Table 6 respectively.

Table 5. Value of Distance and Activity Factor Classified by Activity

Activity			N	ρ	Std. Dev	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
Passive Activity	Activity Individual Activity	Active Group Activity					Lower Bound	Upper Bound		
			19	1.17	2.99	0.69	-0.27	2.61	0.02	13.04
			95	0.37	0.45	0.05	0.28	0.47	0.01	2.91
			20	0.23	0.19	0.04	0.14	0.32	0.03	0.74
			85	0.37	0.54	0.06	0.25	0.49	0.02	3.50
			5	0.46	0.64	0.28	-0.33	1.25	0.03	1.58
			34	0.37	0.75	0.13	0.11	0.63	0.03	4.48
			16	0.41	0.46	0.12	0.16	0.66	0.03	1.89
			15	0.16	0.13	0.03	0.09	0.23	0.04	0.52
Total			289	0.41	0.92	0.05	0.30	0.51	0.01	13.04

Table 6. ANOVA Test for Value of Distance and Activity Factor Classified by Activity

Test	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.99	7.00	1.86	2.28	0.029
Within Groups	229.11	281.00	0.82		
Total	242.11	288.00			

From Table 5, the results indicated that various types of activity affect the value of distance and activity factor. If park users perform single activity at parks, the value of distance and activity factor become 0.37, 0.23 and 0.37 for passive activity, active individual activity and active group activity, respectively. It means that both passive activity and active group activity users would have to spend longer travel time and more travel cost to enjoy these activities at park more than active individual activity. This might be from the reason that passive activity is the activity for socialization, users prefer to spend there free time for get pleasure from various the facility inside park such as zoo, library, museum, etc.

Furthermore, on the same value in active group activity, it could be implied that this activity required more than one player. Consequently, the willingness to travel in longer distance or any expenditure from travel that generated on the way to users' favorite place became acceptable to all park users. When the multiple activities were selected, more travel time and travel cost were used to carry out many different kind of activities together in one time. However, it was the exceptional case for more than two activities were selected to do at parks since the value of triple activity was less than even one kind of activity. It can be seen that there may be other reason to influence on the value of this factor. We studied that the accessibility of parks plays an important role to destination selection to park users. From this

reason, the mode selections for traveling to different destination of parks were investigated for this relationship.

5.2 Transportation Modes to Parks

We noticed that users who visit parks in Saga city took several modes. This study focuses on the investigation of the relationship between distance and activity factor generated from three different modal usages that were walk, cyclist and car. The result of calculation of distance and activity factor based on different type of modes are graphically demonstrated as shown in Figure 3. Along with an analysis of variance (ANOVA) that is necessary to be used to test hypotheses about differences between means of each category. The result indicated that there is differences between means by reject null hypotheses at significance level 0.05. Table 7 is represented as supplement information to verify the result of statistical test.

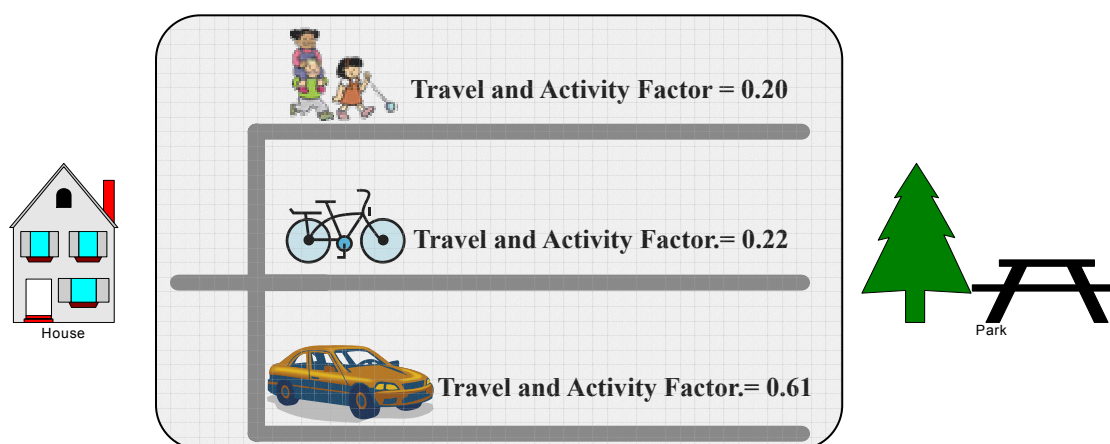


Figure 3. Value of Distance and Activity Factor Classified by Modes

Talbe 7. ANOVA Test for Value of Distance and Activity Factor Classified by Modes

Test	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.135	2	5.568	6.894	0.001
Within Groups	230.972	286	0.808		
Total	242.107	288			

The values from the calculation of travel and activity factor in different modes reflect the meaning that all users travel to parks by different mode value on activity more than travel benefit. Since the value of this factor is less than 1, it can be interpreted that all park users evaluate more importance on activity than travel. Traveling to park is recreational activity that users would focus on some interesting leisure activity to enjoy the scenery and amenity of environment at park rather than consider much about traveling. The result of calculation represents that the economical modes that consist of walking and cycling have almost the same value on this factor. Car users have the greater value on this factor about 3 times of inexpensive modes. This result happens due to reason that there is more expenditure on travel cost of car and there is no cost on others.

We also found very interesting results that lead to the investigation among different modes of traveling to parks that there should be boundary of distance of travel between this cheap mode and costly mode. The following diagram is the explanation of the relationship between travel

and activity distance with indifferent benefit on park visit versus distance that can be demonstrated by Figure 4 and Figure 5.

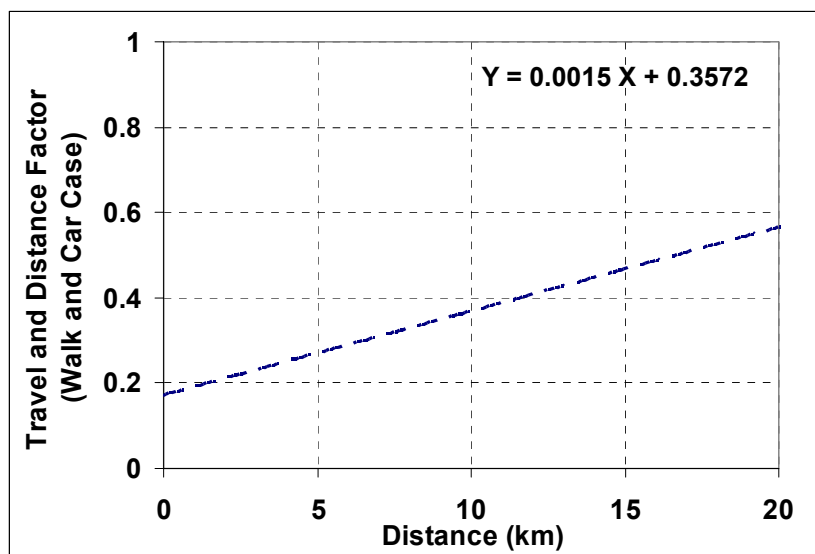


Figure 4. The Relationship Between Travel and Distance Factor (Walk and Car Case)

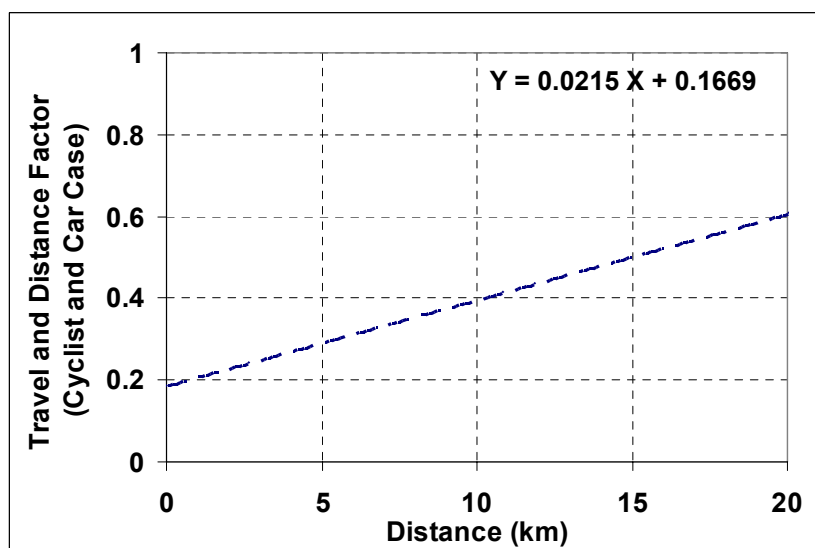


Figure 5. The Relationship Between Travel and Distance Factor (Cyclist and Car Case)

Based on this simple computation, integrated benefit from activity was found that distance has indifferent benefit between walk users and a car user is at 2.14 km. On the other hand, for cyclist and car case, the threshold is approximate 4.35 km. This result implies that when users travel more than 4.35 km., the usage of car would provide more benefit than cyclists. On the opposite way, if the distance is less than 2.14 km., walk to parks would provide more benefits than others. We found that when we compare the travel and activity factor between walking and cycling and car, there is moderately higher value of slope for cyclist and car case graph. It means that at unit change in distance of travel, the cyclist provide more benefit on travel than walking. Since cyclist is more powerful than walking mode in term of travel speed. These

results are useful information for further investigation to be considered for improvement in the provision of park accessibility for walking and cycling.

6. DISCUSSIONS

By integrating the methodology of travel cost method together with activity concerned for estimate non market benefit for outdoor recreation site a case study of park, several useful applications can be obtained. Since the conventional travel cost method is applied to this study has merits on the simplification of derivation, it provides results that are easy to interpret. The actual behavior of park visitors also includes the activity on site. The purchasing goods and service for making trips to parks are considered as one innovative approach to estimate this benefit. The total spending model can be used to estimate the non market benefits of park, and it also provides the useful idea on the travel and activity concerns. The users who travel longer to park would have tendency to stay longer as well. By using this rational result, this study also calibrated the model to determine the travel and activity factor for different case analysis.

Based on the results of analysis, the interpretation can be discussed into two main different categories that are users' pattern activity at park and transportation modes to park. The different value on different kind of activity resulted to application that policy maker or park planners should consider providing suitable facility of different type of users' activities. It can be noticed that different type and multiplication of activities result to different value of activity and distance factors. Actually this factor was obtained from the total spending on travel and activity on site. Therefore, the value of factor can be used to reflect the benefit of travel and activity to different users.

When this factor was applied to determine the relationship on modal usages, the number of valuable results can be examined. Identification on value of factor in each mode is the representative of the relationship between travel and activity on transportation means to park. The results indicate that the different modes provide different value of factors that concern with the accessibility to park. Indifferent benefit was employed to identify the distances that maximize benefit to users on travel to parks by different means. For shorter distance, walking mode is better than walking and car. However, if the distance to park is very long, users would be willing to drive car to park instead of cycling and walking. It can be seen that the diversity of users, pattern of activity and different modes to park result to different benefit on park visit.

7. CONCLUSIONS AND FUTURE RESEARCH

This study employed the unconventional method to determine the relationship of travel and activity to recreational site. Based on the integration of travel cost method and total activity spending, an indirect value of estimation of park users' benefits has been done through an evaluation of recreation expenses on individual and group preference approach. Subsequently the recreation benefit can be determined from actual behavior of park users. The assignment of monetary value also demonstrates an intuitive appreciation for environmental valuation based on park visitors' preference.

It corresponds to the integration of travel expenditure incurred in getting to the site and the

expense on recreation activity at parks. As expected, the result pointed out that the more attractiveness of park induced to the higher benefit value. This result happens due to the willingness for traveling to consume park services. The analysis finding on the travel characteristics indicated that the majority of park visitors who drive to parks compensate their recreation time with a high expense. However, the car users of park visitors also spend longer time to perform recreation activity at parks. Therefore, their travel and activity factor still have value lower than one.

This result showed a useful issue that plays a significant role in generating valuable economic information for local government policymakers to place suitable management plans in maintaining quality of public park service in association with the preference of the community to achieve the goal of livable city. It also can be a useful technique to assist public agencies in planning multiple uses of public lands and prioritize the budget based on benefit value compared to other kind of public facilities.

However, several extensions of the current study should be further studied to retrieve the more useful result on park users' behavior. Along with the finding result on the accessibility of park and pattern of activity, the existing available information is difficult to launch more clarify result to reach effectiveness policy. In addition, GIS also need to be applied since this tool has potential to deal with geographical data and spatial analysis. The integration of these schemes can provide fruitful insights about users' travel behavior on different park location selection for their leisure time and to launch more specifically plan according to the requirement of residential.

ACKNOWLEDGEMENT

The authors would like to express their sincere appreciation to the municipality of Saga city for their contributions in providing valuable data for this study. This study is part of the dissertation for a doctoral degree in Saga University under the financial support by the Japanese Ministry of Education, Science and Culture.

REFERENCES

- Chen, W., Hong, H., Liu, Y. Zhang L., Hou, X. and Raymond M. (2004) Recreation Demand and Economic Value: An Application of Travel Cost Method for Xiamen Island, **China Economic Review**, Vol. 15, 398-406.
- Englin, J. and Shonwkiler, J.S. (1995) Modeling Recreation Demand in the Presence of Unobservable Travel Costs: Toward a Travel Price Model, **Journal of Environmental Economics and Management**, Vol. 29, 368-377.
- Freeman, A.M. III. (1993) **The Measurement of Environmental and Resource Values: Theory and Methods**. Resources for the Future, Washington, DC.
- Iamtrakul P., Teknomo K. and Hokao, K. (2004) Accessibility and Attractiveness for Public Park Utilization: A Case Study of Saga, Japan. **Proceeding of the International Symposium on Lowland Technology (ISLT 2004)**, Thailand, 1-3, September 2004. 319-324.

Liston-Heyes, C. and Heyes, A. (1999) Recreational Benefits from the Dartmoor National Park, **Journal of Environmental Management**, Vol. 55, 69-80.

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

Woolley, H. (2003) **Urban Open Spaces**. Spon Press, London.