Apply SEM to the Behavior of Urban Park Users

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ABSTRACT

One of the most important issues of UN is the development and conversation of urban parks policy. This issue is not only the components of regional resources and spatial plans, but also the outcomes of cultural orders and social ethics. Moreover, an urban park plays key role to environmental maintaining, leisure recreation, and urban precaution and so on. It is no doubt that an urban park is the extremely element of a city in aspects of living, production and ecology. However, the spatial pattern and function of an urban park either consist with its characters or meet with users' needs are the motives of this study.

Exploring the behavior intention of an urban park user and its influencing factors is important for enhancing urban park policy and finding out the main demand of an urban park. This study is undertaken to establish a conceptual framework to describe the behavior intention of an urban park. Then GIS is approach to assist investigate and analyze the users' behavior to different urban parks. And a structural equation model is then employed to formulate the relationship between individual's behavior intention of an urban park and its influencing factors. A set of questionnaires will be designed and citizens in Tainan will be interviewed in order to collect the required data for empirical study purpose.

The main purposes of this study are as follows: 1. to understand the way and property of citizens, 2. to formulate the relationship between individual's behaviors of urban parks, 3. to establish the structural equation model of citizens' behavior to an urban park, 4. to bring up suggestions to improve an urban park.

Keywords: SEM; users' behavior; urban park

1. Introduction

Taiwan has an area of 36,006 km2. At the mid-2003, its population stood at 22.5 million. Taiwan is one of the most densely populated areas in the world (625 capita/km2). Main terrain type is mountain (above 60%) and is not richly endowed by nature. Taiwan is a developing country, although its economy has entered a more-mature stage in recent years. To meet the needs of enhancing national competitiveness in the global economics, most national spatial redevelopment plans have focused on accelerating economic development. During the last decade, its main industry has shifted from labour-intensive to technology-intensive production. High-tech industries have dominated the manufacturing sector (approximate 36% of total manufacturing value).

One of the most important issues of UN is the development and conversation of urban parks policy. This issue is not only the components of regional resources and spatial plans, but also the outcomes of cultural orders and social ethics. Moreover, an urban park plays key role to environmental maintaining, leisure recreation, and urban precaution and so on. It is no doubt that

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an urban park is the extremely element of a city in aspects of living, production and ecology. Owing to the economic-oriented policy, most of land use is utilized to business, industry, and dwelling, there are few for green space, especially in a city. Moreover, the approach of urban park planning has been supplier-orientation in Taiwan, lacking users' view, as the result, green space may be insufficient and unequal, the recreational importance of urban parks for users from various parts of the society needs to be given extra attention.

The paper is concerned to elucidate a renewed action approach and to demonstrate its value for the study of urban park policy. It does not aim to compare or contrast this approach systematically with other positions in the field. The action approach identifies 'cognition' and 'user-oriented' to be a duty of all theoretical propositions. It regards setting up an urban park to be intrinsically user-oriented. The paper distinguishes the differences between six factors of users' behavior intention of an urban park as the influencing factors in the model. The model of a structural equation model is then employed to formulate the relationship between individual's behavior intention of an urban park and its influencing factors. The paper ends with a suggested research agenda to the government to set up an urban park.

2. Literature review

2.1 Satisfaction of urban park

Literature that relates users with satisfaction of urban park abounds with studies that have demonstrated a positive relationship between the two notions (e.g. Oguz, 2000; Syme, et al., 2001). The preference of urban park use based on the socio-economic location of the particular park or whether these preferences are based on a general profile of urban park users in the society regardless of socio-economic background. Urban park satisfaction is one of leisure satisfaction, is commonly assessed using the leisure satisfaction scale (Beard and Ragheb, 1980), with a number of researchers reporting high scores of internal consistency in their studies (Beard and Ragheb, 1980; Riddick, 1986; Misra and McKean, 2000). There are now more than one hundred instruments which claim to measure the notion in some form (Cummins, 1997). The literature mostly concentrates on people's subjective experiences of various life domains, which exemplifies the dynamic nature of the concept of QOL (Andrews, 1986). However, it is generally agreed that the most effective means of assessing QOL is through composite measures (Felce and Perry, 1995).

2.2 Action approach

As Rojek (2005) point out that action theory is a perspective in social and cultural analysis that aims to achieve the meaningful explanation of social reality as the outcome of purposive social action. By 'purposive social action' is meant the motivation and intentions of social actors to achieve selected goals. In sociology, action theory is most closely associated with the positions of Max Weber, symbolic interactionism and ethnomethodology. It has been criticized for overstating the individual freedom and choice of actors. These criticisms have also been made within leisure studies (Rojek, 1985, 1995; Blackshaw, 2003). The danger in emphasizing a structural basis for individual choice and behavior is that the autonomy of social actors is dissolved (Rojek, 2005). However, the action approach is based in an attempt to renew action theory by seeking to consolidate the choice of the actor, the location of behavior and the context of trajectories in an analysis of leisure forms and practice. It focuses on the situated, cognitive and sensual aspects of leisure conduct. It recognizes variation in embodiment, emplacement, location and context. Situation is conceptualized in relational terms and relations are theorized as processes. The action approach envisages a collaborative relationship between researchers and leisure actors to improve access to leisure resources and the experience of leisure. Therefore, a political dimension to leisure studies and the activities of leisure professionals is recognized and encouraged. (Rojek, 2005)

3. Introduction of Tainan City

Tainan City is located in the southwest of Taiwan on the rich and fertile Jianan Plain, with a population of about 740,000 people, and area with 175.65 km2. Tainan City is the fourth-largest city in Taiwan, and is often referred to as the 'temple city'. With the longest history of any major settlement in Taiwan, meanwhile, Tainan is an important cultural, historical and religious centre. Tainan is bordered on the west by the calm waters of the South China Sea and on other sides by Tainan County. The city itself is made up of six districts: East District with an area of 13.42 km2, North District with an area of 10.43 km2, Midwest District with an area of 6.26 km2, Annan District with an area of 107.20 km2, Anping District with an area of 11.07 km2, and South District with an area of 27.27 km2. The total area of the city is 175.65 km2, which shares 0.49% of the area of all of Taiwan.
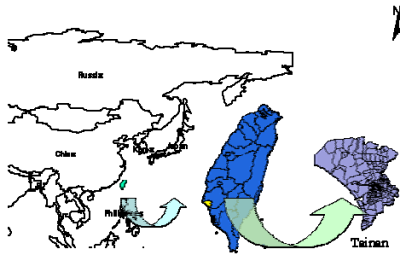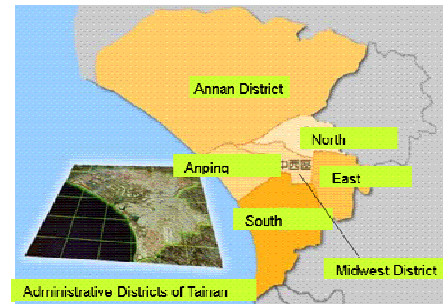

Fig.1. The location of Tainan

Fig.2. Administrative Districts of Tainan

4. Material and methods

4.1 *Sampling*

A questionnaire was administered in five locations in each administrative division Tainan City as shown in the fig.3 (although there are six administrative divisions, but non urban park in the Annan District). Each location was within 2~15 hectare and with local neighborhood parks within a vicinity of 1.5 km. All study sites had some recognizable areas that could be classified as "urban parks". Questionnaires were administered on a "drop and pick up" basis with survey participants being recruited on the basis of initial door to door visits to household members. Any male or female household resident over the age of eighteen was recruited as the responsible person for ensuring the completion of the questionnaire. The survey took four weeks to complete, including weekdays and weekends.

Each respondent was asked to fill in a questionnaire with the help of the interviewer. The questionnaire was designed to measure the respondent's satisfaction of urban park, the computing mindset, the capability of computing application, and the potential of visiting an urban park to a park in Taina City as mention at the section 4.3 and 4.4. A total of 350 completed questionnaires were collected, representing rate of 70%.
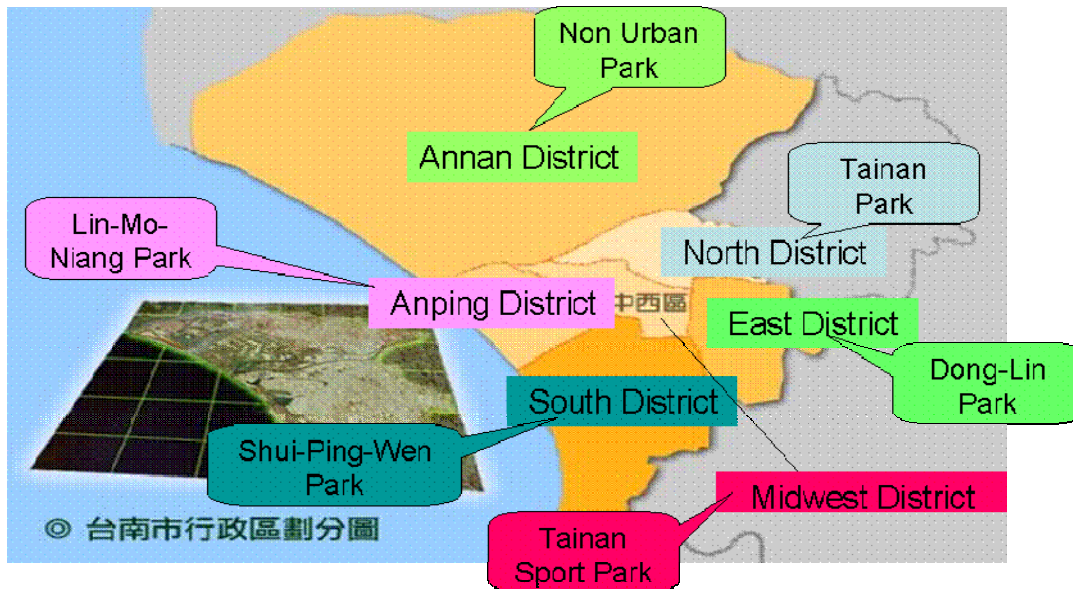
Fig. 3. The location of five urban parks in Tainan City

4.2 The *environments* of five parks

The five parks included in the paper were Dong-Lin Park, Tainan Park, Tainan Sports Park, Lin-Mo-Niang Park, and Shui-Ping-Wen Park, they stretched from north to south of the Tainan City and the area including surrounding reserves varied from just over 2 hectare (Lin-Mo-Niang Park) to about 14.6 hectare (Tainan Park). All parks are the typical urban park in Taiwan and located at each administrative division in the Tainan City (as shown in the fig.4).

Tainan Park

Tainan Sport Park

4

Lin-Mo-Niang Park

Dong-Lin Park

Shui-Ping-Wen Park

Fig. 4. The pictures of five urban parks in Tainan City

4.3 *Questionnaires* design and content

By analysis of the major components of satisfaction of urban park and action approach obtained from the literature, we can extract six major components: motives, traits, self-concepts, accessibility, cognition and satisfaction: (1) Motives is a cause of activity leading an individual to do what he wants to do and what he consistently had in mind to do, and an action which selects and instructs a trigger for a specific activity or an objective. (2) Traits mean a consistent response to physical characteristics and situation or information, and an emotional self-control and careful attitude is "a consistent response" of a more complicated form. (3) Self-concepts mean attitude, a sense of value, and self-portrait, and a sense of value is an element which reflects on responsible activities in a given situation for a short-period. (4) Accessibility is for a space to be well used it must be accessible. In addition, accessibility is essential if people are to attach meaning to a space. (5) Cognition is the ability to perform specific mental or physical tasks, and mental or cognitive skills include analytical or cognitive thought. (6) Satisfaction is the outcomes of people who have experienced the space, and the concept of QOL (Simi-QOL) is usually used to be the tool for measure it.

Hence, the behavior intention of an urban park user and its influencing factors can be as a total set of the respondent's satisfaction of urban park, the leisure mindset, the capability of leisure application, and the potential of visiting an urban park which function as action characteristics of

an individual's experience of an urban park. The four components of an individual's experience of an urban park such as the respondent's satisfaction, the leisure mindset, the capability of leisure application, and the potential of visiting an urban park can be driven from the six components of individual competency such as motives, traits, self-concepts, accessibility, cognition and satisfaction: respondent's satisfaction from Simi-QOL; leisure mindset form self-concepts and traits; capability of leisure application from cognition; potential of visiting an urban park from motives and accessibility. The extracted components of leisure behavioral intensions are utilized as major components of the measurement instrument for an individual's experience of an urban park.

Therefore, this study presents the development of an instrument for measuring user's behavioral intensions, which focuses on the total capability of users computing that he or she can use suitable and enjoyable for experiencing an urban park. And, this paper is predicated on the premise that the four components have positive influences on user performance of an urban park. If a user has the pleased respondent's satisfaction that can attract he or she go to an urban park regularly. From this perspective, we develop the structural model based on the relationship between the user behavioral intensions and the four components.

4.4 *Structural* Equation Models, SEM

In order to confirm the relationship between individual's behavior intention of an urban park and it s influencing factors as mentioned at the section 4.3, this study fitted the structural model, depicted in Fig. 5, to the data. The path diagram focuses on the structural relationship between the remaining 20 measures of influencing factors and the four outcome variables measuring user performance. In this diagram, the measured variables are enclosed in boxes, factors are circled, and arrows connecting two variables indicate relations. The indicators are clustered into six correlated factors, while the four outcome variables compose of the outcome factor. This model explains the effect of individual's behavior intention of an urban park with aspects of an application of influencing factors to his or her performance.

We used LISREL VII to test the efficacy of the structural model. In LISREL, the overall fit of a model can be assessed by chi-square statistic, goodness-of-fit index (GFI), adjusted goodness of fit index (AGFI), and root mean square residuals (RMR). In general, good fit is indicated when chi-square is not significant, the GFI and AGFI are close to one, and the RMR is close to zero (Jamshid & Farhoomand, 1996). In practice, a GFI or AGFI greater than 0.8 and a RMR close to 0.05 are considered as indicators of good fit. Since chi-square statistic as a measure of overall fit is very sensitive to both sample size and dist ribution of observed variables (Bentler & Bonett, 1980; Fornell, 1983), the ratio of chi-square to degrees of freedom was used instead. Hayduk maintains that a ratio of less than 3 indicates goof fit (Hayduk, 1984).

As shown in Table 1, all goodness-of-fit statistics are in an acceptable range. The squared multiple correlations of the variables, which indicate the proportion of variation of an item accounted for by its corresponding factor, are also shown in Table 1. The factor loadings range from 0.598 to 0.865, indicating high correlations between items and their corresponding factors. The coefficient of determination for the structural model was 0.540, presenting that the four factors together indicate about 54% of variation in user performance. We analyzed that the correlations between the six factors and the four components in this paper for examining that the underlying dimensions of individual' s behavior intention of an urban park and its influencing factors are not orthogonal.

Table 1. Standardized factor loadings, squared multiple correlations, and measures of goodness-of-fit for the structural model

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Squared multiple correlation
V1	0.716					0613
V2	0.743					0.652
V3	0.632					0.587
V4	0.612					0.554
V5		0.767				0.676
V6		0.704				0.634
V7		0.789				0.678
V8		0.634				0.589
V9		0.734				0.649
V10		0.702				0.633
V11			0.657			0.576
V12			0.749			0.655
V13			0.834			0.724
V14			0.682			0.616
V15			0.763			0.672
V16			0.674			0.609
V17				0.606		0.548
V18				0.679		0.432
V19				0.602		0.412
V20				0.598		0.387
V21					0.854	0.732
V22					0.824	0.722
V23					0.816	0.712
V24					0.865	0.746
Measures of goodness-of-fit						1.516
Ratio of $\ddot{O}2$ to degrees of freedom Goodness of fit index (GFI)						0.946
Adjusted goodness of fit index (AGFT)						0.943
Root mean square residuals (RMR)						0.061

As shown in Table 2, most individual correlations among the four factors are statistically significant with moderate to large magnitudes, manifesting non-orthogonality of the factors (p-value $<$ 0.05). And, we examined the structural model under the assumption of orthogonal factors again. The difference between the chi-square values for the two models was 268.73 with 16 degrees of freedom, yielding a p-value less than 0.001 for the hypothesis of orthogonal factors. By these results, we concluded that the underlying factors success are significantly related to each other, and cannot be considered orthogonal.

Table 2. Factor correlation matrix

Factor1	1.00			
Factor2	0.57	1.00		
Factor3	0.62	0.78	1.00	
Factor4	0.51	0.61	0.48	1.00

p-value< 0.05

In addition, each of the four items of user performance and their average were separately regressed on the remaining 20 variables. The variables together predict 59% of variation in the performance factor as shown in Table 3. To compare the relative importance of the four factors, we used the important scores obtained from each variable to construct an average important score for the four factors. And, this paper executed an analysis of variance to compare these mean scores, and this resulted in a significant *p*-value less than 0.05. As seen in Table 4, the important factors are satisfaction of urban park and the Capability of leisure application with average scores of 2.198 and 2.367, respectively. The least important factor is the leisure mindset, with mean score of 2.010.

Table 3. R^2 and adjusted R^2 for the regression models

Dependent variable	R^2 (%)	Adjusted R^2 (%)
V21	51.4	43.6
V22	48.8	40.7
V23	44.5	37.4
V24	50.7	42.7
Average of the above four variables	59.0	51.0

Table 4. Comparison of the mean important for the four explanatory factors

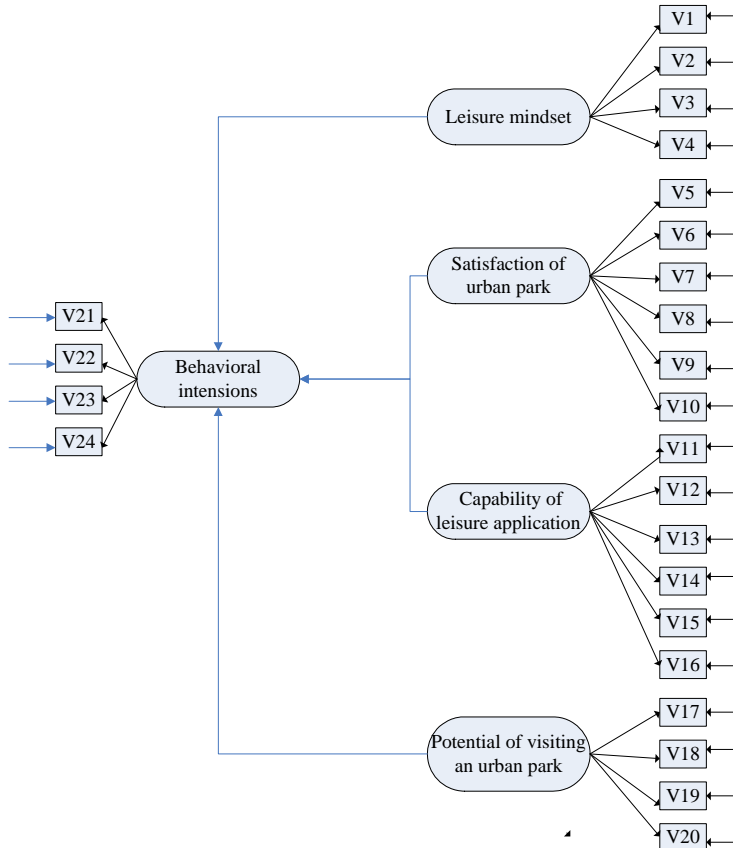| Factor	Mean	SD	95% Confidence interval for mean on pooled standard deviation			
Leisure mindset	2.010	0.789				
Satisfaction of urban park	2.198	0.613				
Capability of leisure application	2.367	0.598				
Potential of visiting an urban park	2.112	0.734	2.11	2.26	2.46	2.64

Fig. 5. Structure model of individual's behavior intention of an urban park

5. Discussion and conclusion

Previous research has been faced with a multitude of challenges related to the measurement of leisure preference and performance, and urban parks setting. In this study, we presented a methodology that can measure a user's behavioral intensions to an urban park and a structural model of user-oriented competency and user performance. This paper opens up a new direction and possibilities of the development of an instrument for assessment of an urban park. By using structural modeling techniques, we found that a significant variation in user performance can be explained by four correlated factors. We believe that the results of this study should be treated with care. Moreover, we warn against interpreting the relation between the factors and user performance in a casual manner.

In spite of this limitation, this study has some important practical implications. For example, the average score of items measuring a particular factor may be used to measure the user's capability of leisure application. This should allow enterprises to identify major departments of a user related to the preference of an urban park. And, the average score of items measuring user performance enable enterprises to evaluate the degree of an urban park.

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