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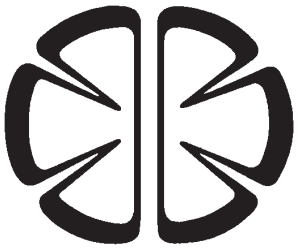

Research Notes & Communications

# A Preliminary Investigation of the Importance of Site Accessibility Factors for Disabled Tourists

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*Disabled people may be a significant market segment for the tourism industry. However, many tourism sites are not well suited to serve disabled tourists. This article offers a method for evaluating the importance of accessibility factors for disabled tourists at tourist sites. It also comments on the differences by which nondisabled or disabled tourists evaluate a tourism site. Some limited empirical evidence is provided to demonstrate how to measure the importance of accessibility factors among disabled tourists.*

Serving the disabled is not something that comes naturally to most people, and many special accommodations must be considered to serve them well. In the United States, the needs of the disabled are covered under the Americans with Disabilities Act (ADA) of 1990. According to the U.S. Census Bureau, some 54 million Americans were covered under the ADA; this constitutes nearly 21% of the U.S. population. Despite the significance of this market segment in the United States and throughout the world, there is almost no academic research that deals with tourism and the accessibility of tourist sites for disabled customers. Nevertheless, evidence from practitioners' journals suggests that there is much need for improvement in the United States (Turco, Stumbo, and Garncarz 1998; Whitford 1998) and in other countries as well ("From a Frenchman's Viewpoint" 1999; Zonnenfeld 2000). In Israel, which is used as an example in this study, there are about 600,000 disabled people, with numerous complaints that they are unable to visit many of the country's tourism sites and attractions (Zonnenfeld 2000).

This article offers a model for evaluating the relative importance of accessibility factors in tourist sites. The relative importance of accessibility factors can be used for developing sites that are better equipped for serving the disabled. The factors of accessibility are also significant in investigating the specific process of evaluating tourist sites by handicapped people since, as this article will show, the disabled use a different rule-based system for evaluating tourist sites. The first part of this article presents the process by which a disabled person evaluates a tourist site. The next part focuses on factors of accessibility and provides the results of a questionnaire completed by 50 disabled people in Israel, identifying the significant factors in evaluating the accessibility of a tourist site. The final part concludes with a discussion of the implications of this study and with suggestions for future research and practice.

## AN EVALUATION OF TOURIST SITES BY DISABLED TOURISTS

The argument offered in this analysis suggests that the process of evaluating a tourist site is similar to a decision-making process. In decision-making terminology, a tourist (decision maker) has an objective of enjoying a tourist

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attraction; he or she evaluates sites (alternatives) that are characterized by factors (attributes) and selects the one that serves his or her objective in the best manner. This process may be individual since different decision makers may have different objectives. Therefore, different decision makers may also generate a different list of attributes and alternatives. Finally, the process of evaluating the alternatives, each characterized by attributes, may be different for different decision makers.

The evaluation of alternatives that are characterized by attributes is a well-researched process. Two different evaluation classes are relevant to the scope of this analysis: compensatory methods and noncompensatory methods. The distinction is made on the basis of whether the advantages of one attribute can be traded for the disadvantages of another. A choice of a compensatory model is appropriate for analyzing cases in which a trade-off between attributes is allowed, and a noncompensatory model is appropriate if trade-offs are not allowed (or possible). This distinction is significant for evaluating the differences by which disabled tourists evaluate a tourism site. Tourists evaluating alternatives often recognize a set of trade-offs between attributes. For example, the trade-off between price and quality is a well-known one. However, for disabled tourists, especially for those in a wheelchair, some trade-offs are impossible and therefore do not exist. For example, the lack of suitable parking for the disabled cannot be compensated for with a shuttle bus to the site. Similarly, a wide staircase cannot compensate for a lack of routes suitable for wheelchairs.

A simple additive weighting (SAW) model is probably the best-known, most widely used compensatory model. In a decision problem with $i$ alternatives, each characterized by $j$ attributes, the value of each alternative can be expressed as

$$V(A_i) = \sum_j w_j v_j(x_{ij}),$$

where $V(A_i)$ is the value function of alternative $A_i$, and $w_j$ and $v_j(x_{ij})$ are the weight and value function of attribute $X_j$, respectively.

This is a compensatory function. For instance, consider a value function with two attributes: $V = w_1v_1 + w_2v_2$. By setting $V$ to a constant, the relationship between the attributes $w_1/w_2 = -\Delta v_2/\Delta v_1$ can be derived. This relationship indicates that if, for example, $w_1 = 0.25$ and $w_2 = 0.75$, the decision maker must be indifferent to the trade between 3 units of $v_1$ and 1 unit of $v_2$. As an analogy, a tourist may be willing to trade a lower quality hotel rating for an increase in the amount of money he or she saves.

Noncompensatory models include a variety of models, including the conjunctive, disjunctive, and elimination by aspect (EBA) models, to name just a few. A complete review of noncompensatory models is offered by Yoon and Hwang (1995). EBA (Tversky 1972), however, is one of the most frequently used approaches for evaluating alternatives in a noncompensatory sequential elimination setting. EBA examines all the alternatives, one attribute at a time, and eliminates the alternatives that do not satisfy a certain standard. The process is repeated until all alternatives except one have been eliminated. In a decision problem, let $X_1$ be the first aspect that is used to eliminate alternatives, followed by $X_2$, $X_3$, and so on. Alternative $A^1$ is screened such that

$$A^1 = \{A_i \mid x_{i1} \text{ satisfies } X_1\},\ i = 1, 2, \ldots, m.$$

If the set $A^1$ has a single element, this element is the most preferred alternative. If there are multiple elements, the process is repeated for aspect $X_2$, such that

$$A^2 = \{A^1 \mid x_{i2} \text{ satisfies } X_2\},\ i \in \{A^1\}.$$

If the set $A^2$ has a single element, then this element is the most preferred alternative. Otherwise, the process continues until a single alternative remains. It should be noted that the lack of a certain attribute cannot be compensated for with a surplus of another, and the alternative is omitted from further consideration.

The distinction between compensatory and noncompensatory models is significant for evaluating the behavior of disabled tourists. As stated before, the argument offered here suggests that a disabled tourist employs a different decision-making process to evaluate a tourist site than a tourist who does not have any disabilities. Specifically, for most tourists, a certain trade-off exists, whereby a lower level of one attribute can be compensated for by a surplus in another attribute. However, for the disabled, a lack in a certain attribute, especially those attributes that support accessibility, cannot be compensated for by a surplus in any other attribute. Therefore, to gauge the contribution of accessibility factors toward the satisfaction of disabled tourists, it is necessary to illustrate the ranking process of these attributes according to their relative significance.

## IMPORTANCE OF ACCESSIBILITY FOR DISABLED TOURISTS

Multiple attribute analysis begins with the generation of a list of relevant attributes, followed by a process of attribute weighting. For attribute generation, Keeney and Raiffa (1976) suggested using a panel of experts or a literature survey of the problem area. It is necessary that the overall goal of the decision maker be represented through the attributes. Pardee (1969) suggested that the list be complete, exhaustive, mutually exclusive, and restricted to the performance degree of the highest degree of importance. In this preliminary study, a literature review of the significant elements of accessibility for disabled people was used to generate a list of seven accessibility factors (in the context of tourist attractions in Israel). Among the sources reviewed was a manual from the Israel Ministry of Tourism, titled *Tourism for All: Accessibility Solution for the Disabled in Tourist Attractions. A Manual for Architects* (Cohen 1999); a summary of legislation related to disabled people (Shibi 1999); and interviews with experts. It should be noted that although there are several different types of disabilities (deafness, blindness, physical, etc.), this analysis focuses solely on the physically disabled, particularly those requiring walking aids (ranging from crutches to wheelchairs).

For the walking disabled, the seven most significant accessibility attributes were staircases, elevators, parking, (accessible) sidewalks, access ramps, paths, and restrooms. It should be noted that these factors could be further detailed in a second level of the hierarchy. For example, the "staircase" factor could be further detailed to include a lower level hierarchy of factors such as height of stair, width of staircase, railing, and so on. Since the interest of this exploratory study

**TABLE 1**

**ACCESSIBILITY FACTOR WEIGHTS**

| Accessibility Factor | Rank | Average Factor Weight | Standard Deviation Factor Weight |
|---|---|---|---|
| Staircase | 7 | 0.036 | 0.040 |
| Elevators | 1 | 0.211 | 0.130 |
| Parking | 2 | 0.197 | 0.128 |
| Sidewalks | 6 | 0.081 | 0.075 |
| Access ramp | 4 | 0.144 | 0.107 |
| Paths | 5 | 0.139 | 0.102 |
| Restrooms | 3 | 0.191 | 0.142 |

**TABLE 2**

**CORRELATION BETWEEN NUMBER OF VISITS AND ACCESSIBILITY FACTOR WEIGHTS**

| Accessibility Factor | Correlation with Number of Visits |
|---|---|
| Staircase | 0.12 |
| Elevators | –0.06 |
| Parking | 0.13 |
| Sidewalks | –0.14 |
| Access ramp | –0.06 |
| Paths | 0.30 |
| Restrooms | –0.19 |

is to identify the significant factors on the macro level, no further detailing of the factors was employed.

Attribute weighting follows the identification of the significant factors. Several different quantitative and qualitative attribute weighting methods exist (for a review of attribute weighting methods, see Yoon and Hwang 1995; Hobbs 1980; Eckenrode 1965). Attribute weighting is important since not all attributes are considered equally important. The role of the attribute weight is therefore an indication of its importance. In this case, pairwise ratio weighting (Saaty 1980) was employed for determining the attribute weights. Weighting attributes in this method require the decision maker's assessment of the importance ratio between each pair of attributes. For example, in a problem with three attributes $x_1$, $x_2$, and $x_3$, there are three pairwise comparisons (the number of pairwise comparisons with $n$ elements is $[n(n-1)/2]$). In each comparison, the decision maker is asked to determine if $x_i$ is more important than $x_j$ using a ratio scale (most often 1-5, or comparable). The comparisons yield an upper or lower part of a triangle in a $(n \times n)$ matrix of ratio weighting as follows (in most cases, $w_i/w_i = 1$, equally important):

$$\begin{bmatrix} w_1 / w_1 & w_1 / w_2 & w_1 / w_3 \\ w_2 / w_1 & w_2 / w_2 & w_2 / w_3 \\ w_3 / w_1 & w_3 / w_2 & w_3 / w_3 \end{bmatrix}.$$

Using the ratios $w_i/w_j$ to compute the geometric mean of each row of the matrix and then normalizing the resulting number generates the relative importance of each attribute.

This method is intensively employed in the psychology and marketing literature (Steenkamp and Hans 1997; Jaccard, Brinberg, and Lee 1986). In this study, the method was employed for weighting the attributes of accessibility to tourism sites. Fifty disabled respondents were randomly approached and asked to complete a pairwise comparison questionnaire of the accessibility factors. In the sample group, there were 34 male and 16 female participants, and the average age was 42. The results are summarized in Table 1. According to the data, elevators were the most significant factor for disabled tourists' accessibility, followed by parking, restrooms, access ramps, paths, sidewalks, and staircases.

Another key factor is the relationship between the disabled tourist's prior experience with visiting tourist sites and the significance he or she assigns to accessibility factors. A correlation analysis was employed to find the relationship between the number of visits to tourist sites and the significance assigned to each factor for the sample group. Despite the fact that all the correlations are relatively weak (except for paths), in this small sample group, the data in Table 2 provide some insights about the evolution of preferences over time and suggest that when the number of visitations to tourist sites increases, so does the relative importance of paths, parking, and staircases, while the significance of restrooms, sidewalks, elevators, and access ramps decreases.

The data on the relative importance of accessibility factors requires some interpretation. Clearly, an evaluation of the relative importance of accessibility factors may direct future improvements in tourism sites. From an operational standpoint, managers should direct their attention to the most significant factors and improve the site performance accordingly. These improvements should be communicated to the target segment. Second, the relative importance of the factors may also assist in analyzing the disabled tourist's decision-making process while evaluating a tourist site. When considering disabled tourists, the relative importance of accessibility factors should be interpreted differently than for nondisabled tourists. As mentioned before, there are two distinct approaches for evaluating attributes: compensatory and noncompensatory. The proposition offered here is that for disabled tourists, the process is primarily noncompensatory, thus suggesting that a disadvantage in one attribute (e.g., parking that is inaccessible for the disabled) cannot be traded for advantages in any other attribute (e.g., accessible sidewalks). If the process is characterized as noncompensatory, the relative importance of the accessibility factors suggests that disabled people may evaluate tourist sites on a yes/no basis. For example, if elevators are the most important factor, the absence of elevators may generate a decision not to visit the site, regardless of other factors that may exist there. Moreover, it would seem that most disabled tourists first screen sites according to the relative importance of accessibility factors, ruling out those that they have no intention/ability to visit.

The correlation study suggests that after prior experience with visits to tourist sites, customers tend to update the importance they assign to different factors. For example, the apprehension of being unable to use the restrooms (as they may not be handicapped equipped) tends to decrease as the number of visits to tourist sites increases. However, the recognition of the significance of paths tends to increase as the number of visits increases. This may suggest that the disabled tourist finds, through experience, which factors are the most significant for accessibility.

## IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

These findings have some practical applications for managers in the tourism industry who are interested in attracting the disabled people market segment. In many places, tourist attractions are not suitable for serving the disabled. Therefore, an investigation such as the one provided here may provide a good starting point. The hierarchy of factors can (and should) be expanded to include other factors, and lower levels of the hierarchy could be employed to provide micro-level definitions of the factors. The findings may be significant from (1) an operational perspective (improving sites according to customer needs) and (2) a marketing/promotion perspective (communicating to the disabled that the site is prepared to serve them).

The process by which a disabled tourist evaluates a site remains unresolved. However, as this analysis posits, it may be initially a noncompensatory procedure, which eliminates alternatives, and then a compensatory model may be employed to trade off attributes. Future research should therefore address this issue of the disabled consumer evaluation process and investigate if a mixed model can adequately explain this decision process. In addition, due to the small number of participants and the exploratory nature of the study, the data set does not support a full-scale evaluation of the evolution of preferences over time or allow the comparison of people with different levels of disabilities. Nevertheless, future studies should focus on these significant factors and address differences between and among groups of people with disabilities.

## REFERENCES


Cohen, R. (1999). *Tourism for All: Accessibility Solution for the Disabled in Tourist Attractions. A Manual for Architects*. Jerusalem: Israel Government Press (in Hebrew).

Eckenrode, R. T. (1965). "Weighting Multiple Criteria." *Management Science*, 12: 180-92.

"From a Frenchman's Viewpoint." (1999). *Accents of Living*, Spring, 74.

Hobbs, B. F. (1980). "A Comparison of Weighting Methods in Power Plant Citing." *Decision Sciences*, 11: 725-37.

Jaccard, J., D. Brinberg, and J. A. Lee (1986). "Assessing Attribute Importance: A Comparison of Six Methods." *Journal of Consumer Research*, 12 (4): 463-68.

Keeney, R. L., and H. Raiffa (1976). *Decisions with Multiple Objectives*. New York: John Wiley.

Pardee, E. S. (1969). *Measurement and Evaluation of Transportation System Effectiveness*. RAND Memorandum RM-5869-DOT. Santa Monica, CA: RAND.

Saaty, T. L. (1980). *The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation*. New York: McGraw-Hill.

Shibi, A. (1999). *Disabled People Tourism—Where To?* Milbat—Tel-Hashomer (in Hebrew).

Steenkamp, J.E.M., and M. V. Hans (1997). "Attribute Elicitation in Marketing Research: A Comparison of Three Procedures." *Marketing Letters*, 8 (2): 153-65.

Turco, D. M., N. Stumbo, and J. Garncarz (1998). "Tourism Constraints for People with Disabilities." *Parks and Recreations*, 33 (9): 78-84.

Tversky, A. (1972). "Elimination by Aspects: A Theory of Choice." *Psychological Review*, 79: 281-99.

Whitford, M. (1998). "Responsibility for Accessibility Spreads." *Hotel and Motel Management*, 3 May, 1, 4.

Yoon, K. P., and C. L. Hwang (1995) *Multiple Attribute Decision Making: An Introduction*. Thousand Oaks, CA: Sage.

Zonnenfeld, T. (2000). "Disabling the Disabled." *Ma'ariv-Business*, 10 March (in Hebrew).