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### **A Framework for Monitoring and Modeling Sustainable Tourism**

This study examined the relative contribution of four sustainability dimensions in predicting residents' satisfaction with a National Park's role in tourism development. Residents from three communities bordering the Hoge Veluwe NP in The Netherlands were included in the study. Structural equation modeling supported the hypothesis that all four latent dimensions were significant predictors of resident satisfaction with sustainable tourism. The economic dimension was the strongest predictor followed by the institutional, socio-cultural, and ecological. Findings highlight the need to include all four dimensions when monitoring sustainable tourism development.

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*Key words:* sustainable tourism, predictors, dimensions of sustainability

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## Introduction

Indicators that monitor tourism impacts can signal societal trends and resource changes pertinent to environmental health and quality of life; modeling the relationships among these indicators can facilitate understanding sustainable development goals in tourism destination areas (Sirakaya, Jamal, & Choi, 2001). Prior research has developed reliable and valid indicators of sustainable tourism development (Choi & Sirakaya, 2005), yet a holistic framework for monitoring sustainable tourism impacts remains untested (Eden, Falkheden, & Malbert, 2000).

Sustainable tourism development (STD) has traditionally been defined in terms of *economic, ecological* and *socio-cultural* considerations. Balancing these three classic dimensions of STD is difficult, however, without an *institutional* perspective to facilitate growth (Eden et al., 2000; Spangenberg, 2002; Spangenberg & Valentin, 1999). The institutional dimension emphasizes participatory decision-making processes such as public participation and involvement. This study used the four-dimensional “prism of sustainability” (Spangenberg & Valentin, 1999) framework as a conceptual lens to monitor and model sustainable tourism development.

### *Framework overview*

The *ecological dimension* emphasizes the need to reduce pressure on the physical environment. The *economic dimension* considers human needs for material welfare (e.g., employment) in a framework that is competitive and stable. An economic system is environmentally sustainable only as long as the amount of resources utilized to generate welfare is restricted to a size and quality that does not deplete its sources for future use. The *social dimension* refers to individuals’ skills, dedication, experiences and resulting behavior. Institutions represent organizations within a system of rules governing interaction among members. The *institutional dimension* calls for

strengthening people's participation in political governance. Valentin and Spangenberg (2000) suggest that the four dimensions can be linked to *indicators* for local communities to monitor and evaluate sustainable development.

### *Study purpose and setting*

This study examined the construct validity of the four dimensions of sustainability on local residents' satisfaction with tourism in communities bordering Hoge Veluwe National Park (HVNP) in The Netherlands. Based on prior research (Ankersmid & Kelder, 2000; Cottrell & Duim, 2003; Dymond, 1997; Sirakaya et al., 2001), we predicted that each dimension of sustainable tourism would influence resident satisfaction with tourism development.

HVNP, established in 1935, is one of the largest national parks (5,500 hectares) in the Netherlands. The area was fenced in the early 1900s to serve as a hunting reserve with animals brought from abroad. The Hoge Veluwe remained a family estate of Kröller-Müller's until 1935 when they donated their land to the Dutch government as a national foundation. There are three entrances to the park, each adjacent to a small village.

### Methods

Data were obtained from on-site surveys at the three communities bordering HVNP. The study population included local people 16 years or older in the villages of Hoenderloo, Otterloo, and Schaarsbergen. Interviewer completed surveys (n = 142, response rate = 46%) were conducted in shops and bakeries during June 2003. Ancillary analyses comparing villagers from the three communities revealed statistical equivalency in their survey responses, and the data were aggregated for purposes of this paper.

### *Variables measured*

Drawn from previous research (Ankersmid & Kelder, 2000; Cottrell & Duim, 2003; Dymond, 1997; Sirakaya et al., 2001), three to six items were used to measure each dimension of sustainable tourism. Perceived satisfaction was operationalized as the average of five items asking respondents their satisfaction with various aspects of tourism in their area. With the exception of one dichotomous variable (i.e., Are you satisfied with tourism in your area? Coded 1 = Yes, 0 = No), all variables were coded on 5-point disagree (1) to agree (5) scales.

Reliability analyses were used to examine the internal consistency of items measuring each dimension. Pair-wise t-tests were used to compare the average scores for each latent construct. Confirmatory factor analysis and structural equation modeling (AMOS 5.0) were used to assess the multivariate relationships.

### Results

Reliability coefficients for the four STD dimensions ranged from  $\alpha = .55$  (3-item institutional dimension) to  $\alpha = .75$  (6-item socio-cultural dimension) (Table 1). The Cronbach's alpha for the five items measuring satisfaction with tourism development was .63 (Table 2). Deleting any of the items from a dimension did not improve the scale's reliability. Indices were computed as the average of the variables comprising each dimension. For the satisfaction construct, the composite index was based on Z-scores because one of the variables was dichotomous.

Tables 1 and 2 about here

Residents were most satisfied with the economic dimension of sustainable tourism ( $M = 3.86$ ) followed by the ecological ( $M = 3.37$ ) and the socio-cultural ( $M = 3.32$ , Table 1). Residents were least satisfied with the institutional aspects of sustainable tourism ( $M = 2.53$ ). Six pair-wise t-tests were used to test the independence of each dimension. After adjusting for the multiple

comparisons (Bonferroni correction =  $.05 / 6 = .008$ ), significant differences ( $p < .001$ ) were observed between the dimensions (with the exception of the ecological – socio-cultural comparison). These findings highlight the importance of each concept when monitoring tourism impacts.

Further support for the four-dimensional model of sustainable tourism was provided by the confirmatory factor analysis (Figure 1). The factor loadings for the observed variables on the associated latent constructs ranged, on average, from .55 (institutional) to .65 (economic). Only two variables had a factor loading less than .40 (i.e., X10 on the economic dimension = .38 and X16 on the socio-cultural dimension = .37). Competing confirmatory models that allowed the observed variables to cross load did not improve the overall fit; therefore the model shown in Figure 1 was used to describe the data.

Figure 1 about here

A structural equation model supported the hypothesis that all four latent dimensions were significant predictors of resident satisfaction with sustainable tourism ( $\chi^2 / df = 2.36$ , RMSEA = .098) (Figure 1). The economic ( $B = .69$ ) dimension was the strongest predictor followed by the institutional ( $B = .44$ ), socio-cultural ( $B = .40$ ), and ecological ( $B = .37$ ).

### Conclusions

Findings supported the hypothesis that all four dimensions contribute to resident satisfaction with sustainable tourism. Given the small sample size, such findings must be viewed cautiously. However, it's interesting to note that the economic dimension was the strongest predictor of tourism satisfaction. Examining the predictive contribution of each dimension at a tourism destination highlights which dimension has the greatest influence on resident beliefs about tourism development.

Theoretically, this study illustrates the importance of the institutional dimension in addition to the traditional economic, ecological and social dimensions. Consistent with Eden et al. (2000), local resident ratings of satisfaction with tourism were influenced by the institutional context of the study site.

While encouraging, our findings highlight the need for refining the items used to measure institutional support. Items for our institutional dimension were primarily participation in decision making measures. The institutional dimension, however, may encompass several sub-dimensions: access to decision making, communication processes, politics, and democracy (Spangenberg, 2002; Valentin & Spangenberg, 2000). Further research is necessary to clarify an appropriate array of institutional indicators beyond our investigation.

Following the development of a valid and reliable set of sustainable tourism indicators, it is equally necessary to develop standards for each indicator. For example, what percent of local residents need to be satisfied with each dimension to claim that sustainable tourism has made a positive contribution to society? Development of indicator specific standards is only possible with continued monitoring of tourism development. The relative contribution of each component and its predictive contribution, however, will vary depending on the situational specifics of each study or community under investigation.

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Table 1. Scale item indicators for four latent dimensions of sustainable tourism (Hoge Veluwe NP)

Latent dimensions and observed indicators of sustainable tourism <sup>1</sup>	Observed Variable	Cronbach's $\alpha$	Mean <sup>2</sup>
<b>Institutional Dimension</b>		<b>.555</b>	<b>2.53</b>
Local inhabitants have influence on decision making process	X1		2.2
Tourism contributes to better waste management of the region	X2		2.5
Good communication among parties involved in policy and decision making process exists	X3		2.8
<b>Ecological Dimension</b>		<b>.712</b>	<b>3.37</b>
Tourists cause pollution of environment (water, soil and air) <sup>3</sup>	X4		2.9
The number of visitors results in disturbance of plants and animals <sup>3</sup>	X5		3.3
Increasing exhaustion of water and energy resources was caused by tourist activities <sup>3</sup>	X6		3.8
Tourism does not lead to the extinction of species in the region	X7		3.5
<b>Economic Dimension</b>		<b>.652</b>	<b>3.86</b>
Tourism brings more income to the local communities	X8		4.0
Tourism increases the consumption of local products	X9		3.6
Tourism creates job opportunities for local people	X10		3.9
<b>Socio-cultural Dimension</b>		<b>.755</b>	<b>3.32</b>
There are too many tourists coming to the region <sup>3</sup>	X11		3.2
Tourism development causes a change of local lifestyle and traditional habits <sup>3</sup>	X12		3.0
Tourists annoy me <sup>3</sup>	X13		3.9
Visitors to NP cause too much noise <sup>3</sup>	X14		3.8
Changes in local lifestyles from tourism is positive	X15		2.9
Tourism has increased the level of criminality, alcoholism, vandalism <sup>3</sup>	X16		3.2

<sup>1</sup> Items measured on 5-point agreement scales where 1 = strongly disagree and 5 = strongly agree

<sup>2</sup> Dimensional scale means in bold

<sup>3</sup> Item reverse coded

Table 2. Scale item indicators for latent dependent variable – satisfaction with sustainable tourism <sup>1</sup>

Latent dimensions and observed indicators of tourism satisfaction	Observed Variable	Mean
Job opportunities in tourism industry are equal for both men and women <sup>2</sup>	Y1	3.4
Infrastructure locally is improved and more accessible because of tourism to NP <sup>2</sup>	Y2	3.3
It is important to have sustainable tourism in my region <sup>2</sup>	Y3	4.0
Tourism development in the area makes the surrounding landscape more attractive <sup>2</sup>	Y4	3.4
Are you satisfied with tourism in your area? <sup>3</sup>	Y5	.79

<sup>1</sup> Cronbach's Alpha = .63

<sup>2</sup> Item measured on 5-point agreement scales where 1 = strongly disagree and 5 = strongly agree

<sup>3</sup> Dichotomous variable where 1 = Yes, 0 = No

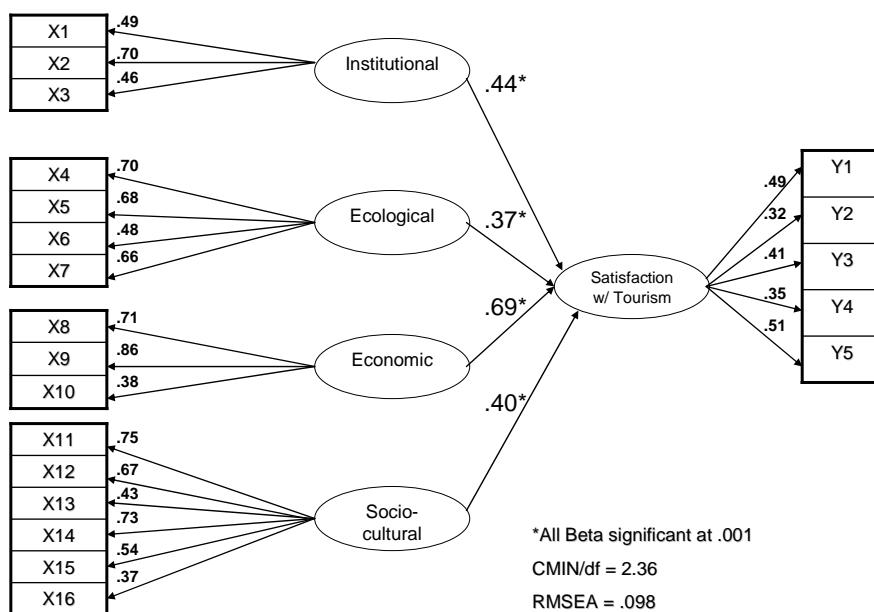


Figure 1. Confirmatory factor analysis and SEM results