

Environmental Sustainable Management of Small Rural Tourist Enterprises

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ABSTRACT: Rural and nature tourism has experienced high growth over the past 20 years. One of the primary challenges facing rural tourism management is to establish a profitable and environmentally sustainable industry. Moreover, sustainable tourism is a complex concept and it requires that nature and tourism activity should be studied from an integrated point of view. In this paper, we analyze how the environmental perceptions of entrepreneurs are included into business management. Through a partial least squares (PLS) model, we estimate several latent factors related to various aspects of business management and, in a second phase, we use the FIMIX-PLS algorithm to achieving a segmentation of entrepreneurs according to the structure of relationships obtained, which may allow identification of which factors are more related to an “ecopreneurial management”

Key words: Ecopreneur, Environment, Sustainable Rural Tourism, PLS, FIMIX

INTRODUCTION

Rural and nature tourism has experienced high growth over the past 20 years. On one hand, it has become an alternative to other more traditional forms of tourism, driven by increased environmental awareness of tourists, especially those from developed countries. After this first phase, the second stage is more complex and the focus is on expansion, differentiation and sustainability (Long & Lane, 2000). One of the primary challenges facing rural tourism management is to establish a profitable and environmentally sustainable industry. Moreover, sustainable tourism is a complex concept and it requires that nature and tourism activity should be studied from an integrated point of view (Farrel & Twinning-Ward, 2005). This is particularly important in the rural tourism context that is highly dependent on natural resources. It is increasingly being recognized, that the challenges facing rural tourism management can be more effectively addressed by applying new ways of thinking and doing based on principles of sustainable development. Planning, management, integration into local economy, partnership and cooperation, assessment, research and training and education, are tools that should be implemented for sustainability of the rural tourism.

The earlier investigations of the environmental management were focused on the reduction of costs

and effects associated with the environmental protection and their influence on competitiveness. The benefits that result from enhanced demand may act as an incentive for voluntary environmental management activities by tourism enterprises (Huybers & Bennett, 2002). In the supply side, these activities are related to cost saving achieved in certain areas, as water and energy usage, product purchase or waste minimization. In the demand side, the tourism enterprises can offer enhanced tourism experiences to increasingly environmentally aware tourists (Mihalic, 2000).

In the specialized literature, limited academic interest has focused on small firm management and environmental response. The numerical dominance of small tourism enterprises and their central role in human activities suggest that these entities have a relevant role on sustainability. However, there is no comprehensive mechanism to evaluate their contribution (Tzschentke *et al.*, 2008). The research in this area has focused on small tourism enterprises' attitudes (Carlsen *et al.*, 2001), interpretation and their application of sustainable tourism principles (Revell & Rutherford, 2003). But, the adoption, and maintenance, of environmentally responsible practices by this group of firms is therefore especially critical. Therefore, there is an apparent disconnect between attitudes and action in the small firm context: an owner-

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manager can have a positive attitude towards the environment in general but, this is frequently not translated into appropriate environmental practices (Tilley, 1999; Vernon, *et al.*, 2003). Environmental concern was initially measured in relation to specific issues and correlated to socio-demographic and personality variables. Later, some studies identifying a correlation between cognitive, attitudinal and behavioral variables using a multi-dimensional scale (Schlegelmilch *et al.*, 1996).

Environmental business management has focused, traditionally, on why enterprises become sustainable (Gladwin *et al.*, 1995). But on rural tourism, the “green entrepreneur” or “ecopreneur”, combining management with environmentalism, is calling to play an essential role. The development of environmental services provides business opportunities and environmentally sustainable options. Ecopreneurs are able to utilize green issues as a competitive advantage through energy and resource maximization, waste reduction, and utilization and respect of ecosystem services.

To explain the motivation and impacts of ecopreneurs, researchers have developed various typologies that explore the interplay between personal

motivations and the influence of the economics and social structures within which they operate (Volery, 2002; Walley & Taylor, 2002). But it has been difficult to establish a profile of ecopreneur, their characteristics, and the differences with the others entrepreneurs (Weaver & Lawton, 2007).

In this context, this paper aims, firstly, to analyze how it integrates environmental perceptions of entrepreneurs in business management. This objective is studied through the construct and estimation of several latent factors related to various aspects of business management. In a second phase, it addresses the segmentation of entrepreneurs according to the structure of relationships obtained, which may allow identification of which factors are more related to an “ecopreneurial management”.

MATERIALS & METHODS

To capture the environmental perceptions of rural tourism entrepreneurs and how it affect their management strategy, we use a questionnaire that identifies five latent variables: the perceived environmental impacts of activities, the importance of “green attitudes”

Table 1. Environmental perceptions questionnaire

<p>M1.- It is useful to implement a code of environmental best practice.</p> <p>M2.- Application of ecological criteria in investments, purchases, etc.</p> <p>M3.- Need for staff training and motivation regarding environmental goals.</p> <p>M4.- Information for customers, workers and suppliers on sustainable environmental conduct.</p> <p>C1.- Customers' environmental attitudes are satisfactory.</p> <p>C2.- There is economic incentives for encouraging best environmental practice.</p> <p>C3.- My customers appreciate best environmental practice.</p> <p>C4.- Respect for the environment helps to attract new customers.</p> <p>S1.- In rooms and communal toilets there is information on water-saving measures, asking customers to cooperate in this.</p> <p>S2.- Importance of introducing water-saving systems.</p> <p>S3.- Water-saving toilet cisterns have been installed (e.g. with two buttons or short flush).</p> <p>S4.- We regards the energy rating of domestic appliances as important.</p> <p>S5.- We regards the installation of energy-saving measures as important.</p> <p>S6.- We has energy control systems (thermostats, timers, etc.)</p> <p>S7.- Bulbs that stay on for more than two hours are of the low-energy type.</p> <p>S8.- We regards the use of solar energy in our business as necessary.</p> <p>E1.- Need to use non-polluting climate control systems.</p> <p>E2.- We make sure to buy biodegradable detergents and, generally, cleaning products with a low environmental impact.</p> <p>E3.- We regards the separation of waste as important.</p> <p>E4.- We regards the treatment of toxic waste as important.</p> <p>E5.- We sort containers and packaging, separating glass, plastic, metal and paper.</p> <p>E6.- We separate special waste (batteries, toner, etc) and hand it over to an authorized waste manager.</p>
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of customers, the water saving goals, the efficient use of energy, and the management strategy (Table 1).

The main purpose of this paper is to analyze the relationships between these latent variables to answer how the rural tourism entrepreneurs include the environmental concern in the business management strategy. For this aim, we propose four basic hypotheses:

H1: The environmental factor has a position influence on the customer factor.

H2: The water saving factor is influenced by the environmental variable (H2.1) and the customer factor (H2.2).

H3: The energy saving factor is influenced by the environmental variable (H3.1) and the customer factor (H3.2).

H4: The managerial factor is influenced by the environmental factors (H4.1), the customer variable (H4.2), the water saving factor (H4.3) and the energy saving (H4.4).

To confirm these hypotheses we estimated a structural model using partial least squares (PLS), as no initial assumption of normality in the variables is required, there is no firmly established theory and this is a predictive research model of the effects of some variables on others (Anderson & Gerbing, 1988; Barclay *et al.*, 1995; Chin *et al.*, 2003).

Our working assumptions were empirically tested on the basis of responses to the questionnaire given by rural tourism entrepreneurs in the Spanish region of Castilla-La Mancha. The choice of this geographic framework was based on the importance of rural tourism in the region as against more traditional tourism models (Gómez *et al.*, 2007), and also on its close relationship with its natural resources and landscapes (Mondéjar *et al.*, 2008). The entrepreneurs were selected at random, seeking to cover the widest possible spectrum as regards place of origin, age, sex, etc. The final number of questionnaires deemed valid once incomplete ones had been ruled out was 210.

In structural equation modelling with latent variables is easy distinguishing between measurement and structural models and explicitly taking measurement error into account. The partial least squares (PLS) path modelling is a variance-based technique recommended in an early stage of theoretical development in order to test and validate exploratory models (Henseler *et al.*, 2009). According to Barclay *et al.* (1995), using this covariance structure model allows the researcher to:

-Deal with the measurement errors. This is fundamental when the variables of interest are latent and

must be put into operation through others measurable variables.

- Model relations between multiple variables, both measurable and latent, and estimate direct and indirect effects.
- Combine a priori theoretical knowledge and hypotheses with empirical data. This facilitates the statistical confirmation of theories (so the models are more confirmatory than exploratory).

The PLS focuses on analyzing the relationships between the latent variables (inner model); however, latent variables are measured by means of a set of observed variables or indicators. In a reflective measurement model, the relationships between latent variables and its indicators (outer model) involve paths from the first one to the last ones. This technique is useful when concepts are abstract or when the current knowledge or data allows only imperfect empirical representations of them.

RESULTS & DISCUSSION

Accordingly, with the aim of carrying out a confirmatory factorial analysis, this study undertook an estimation of a structural equation model showing the conformation of the covariance matrix, using the PLS method with the program SmartPLS 2.0.M3 (Ringle *et al.*, 2005). For the measurement sub model we used the study's factorial structure, which allows us to decide which items are used as indicators of each latent variable (factor), as shown in fig. 1. For the structural sub model, following the theoretical framework set out in the previous section, we establish the relationships indicated by the four hypotheses. The results obtained for the sub model bear out the choice of indicators. This outcome also constitutes a measure of the validity of the questionnaire used to capture the five latent dimensions. The usual goodness of fit measure, proposed in Tenenhaus *et al.* (2005), is the geometric mean of the average communality (outer model) and the average R^2 (inner model), with a value of [0.4112]. As to the reliability of the instrument of measurement, the Cronbach's alpha value for all the latent variables is acceptable (Nunnally & Berstein, 1994), as shown in Table 2. The composite reliability indices are also greater than 0.5 in all cases.

As regards convergent validity (AVE), the values of all dependent constructs are greater than 0.25, (Fornell & Larcker, 1981). Likewise, the cross-loads are always greater for the latent variables on which the respective items are loaded. The discriminate validity criterion (Fornell & Larcker, 1981) is met, as for the five latent variables; the corresponding AVE is greater than the square of the estimated correlation between them: (Table 3).

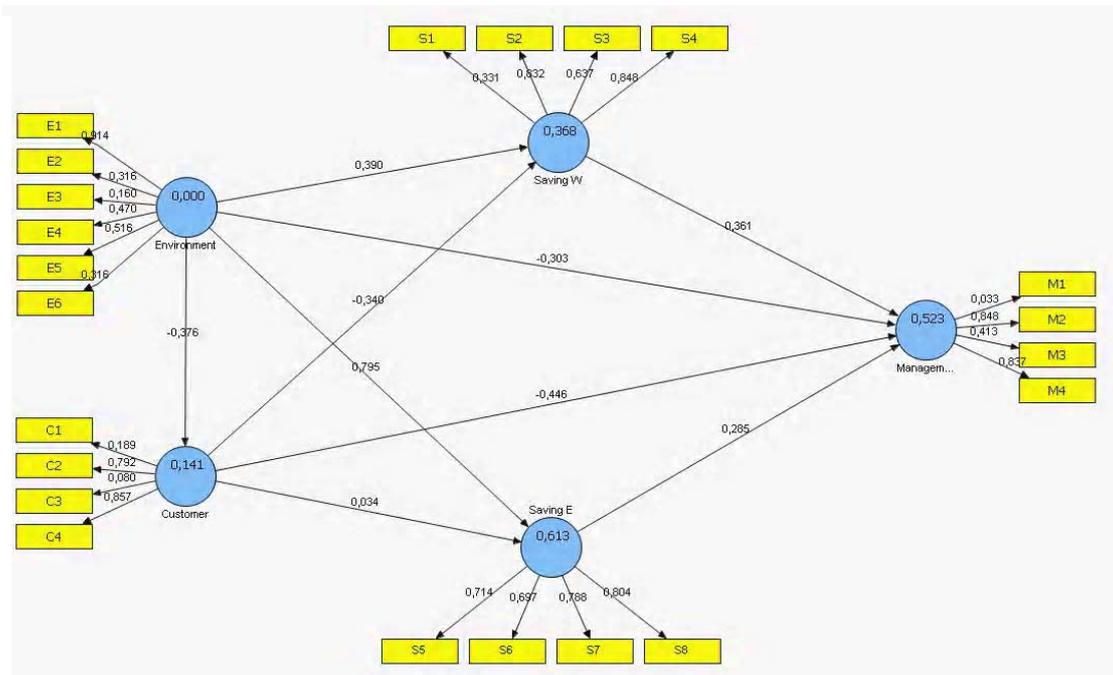


Fig. 1. Estimation of the structural equation model

Table 2. Reliability measurements

	Average	Composite Reliability	R Square	Cronbach's Alpha	Communality	Redundancy
Customer	0.35 1350	0.586687	0.141 283	0.560112	0.351351	0.046619
Environment	0.25 7904	0.619320		0.72 1210	0.257901	
Management	0.39 7821	0.653362	0.523417	0.600274	0.397822	0.139961
Saving Energy	0.56 5619	0.838420	0.613319	0.74 7653	0.565618	-0.008333
Saving Water	0.48 1635	0.771791	0.367571	0.67 4021	0.481634	0.076504

Table 3. Matrix of correlation between latent variables

	Customer	Environment	Management	Saving Energy	Saving Water
Customer	1.000000				
Environment	-0.375877	1.000000			
Management	-0.583552	0.274349	1.000000		
Saving Energy	-0.265213	0.612525	0.424015	1.000000	
Saving Water	-0.486569	0.506160	0.624673	0.693645	1.000000

$$AVE_i > P_i^2_j$$

$$AVE_j > P_i^2_j$$

Regarding the structural sub model, as shown in Table 2, the R² coefficients associated with latent variable regressions are significant, with values greater than 0.1 all cases (the acceptable value cited in Falk & Miller, 1992). An analysis of direct and overall effects, shown in Table 4. highlights the dependence existing between the latent variables and tends to confirm the initial hypotheses for the model. To confirm the theo-

retical assumptions, Table 5 shows the regression coefficients between latent factors, estimated by PLS, their t-statistics and p-values. The eleven proposed relations have significant values, confirming the three basic hypotheses in its various concretions.

The assumption that all the entrepreneurs are single homogeneous population is often unrealistic. Identification of different groups in connection with estimates in the inner path model constitutes a critical issue for applying the path modelling methodology. To try to identify groups of entrepreneurs with similar

Table 4 . Direct and overall effects between latent variables

	Direct effects				Overall effects			
	Customer	Management	Saving E	Saving W	Customer	Management	Saving E	Saving W
Customer		-0.446426	0.033678	0.339858		-0.559475	0.033678	0.339858
Environment	0.375877	-0.303021	0.795183	0.390315	0.375877	0.274349	0.782525	0.518060
Management								
Saving E			0.284513			0.284513		
Saving W			0.360828			0.360828		

Table 5 . Tests of Hypothesis for direct effects between latent variables

	Direct Effects	T-statistic	P-values
H1.1 Environment → Customer	-0.375877	2.214627	0.0183
H2.1 Environment → Saving W	0.390315	9.450880	0.0000
H2.2 Customer → Saving W	-0.339858	3.767046	0.0005
H3.1 Environment → Saving E	0.795183	12.816672	0.0000
H3.2 Customer → Saving E	0.033678	0.340958	0.3681
H4.1 Environment → Management	-0.303021	2.716433	0.0060
H4.2 Customer → Management	-0.446426	7.404012	0.0000
H4.3 Saving W → Management	0.360828	7.289774	0.0000
H4.4 Saving E → Management	0.284513	2.460216	0.0107
Goodness of Fit	0.4112		

behaviour (that is, *ecopreneurs segments*) we use the FIMIX-PLS algorithm (Hahn *et al.*, 2002), that combines a finite mixture procedure with an EM-algorithm (Jedidi *et al.*, 1997). This approach permits reliable identification of different tourists segments with their characteristic estimates for relationships of latent variables in the structural model. For choosing the appropriate number of segments, it is usual to repeat, sequentially, the FIMIX-PLS procedure with consecutive numbers of latent classes, that are compared for criteria such as the lnLK, the Akaike Information Criterion (AIC), the AIC Controlled (CAIC), the Bayesian Information Criterion (BIC) or the normed entropy statistic (EN). The last criterion is a critical one for analyzing segment specific results (Ramaswamy *et al.*, 1993).

In this paper, we applied the FIMIX-PLS module of SmartPLS 2.0 to segmentation. A comparison of the

class-specific computations for heuristic evaluation criteria (Table 6) reveals that the choice of three groups is appropriate. This result shows that there are three groups of entrepreneurs with different covariance structure in the inner model. To explore this heterogeneity, firstly, we re-estimate the model for each group. As shown in Table 7, the model is better adjusted for the three segments, especially in the second and third ones, with high values for the composite reliability indices and the convergent validity (AVE).

The R² coefficients associated with latent variable regressions are high in all cases except for the customer. An analysis of direct effects, shown in Table 8, highlights the dependence existing between the latent variables and allows answers why the groups differ.

Table 6. Criteria for model choice

Number of segments	lnL	AIC	BIC	CAIC	EN
K = 2	-180.2273	414.4546	464.9770	465.5337	0.7517
K = 3	156.9516	-231.9031	-155.1839	-154.3385	0.9835
K = 4	426.5485	-743.0971	-640.1810	-639.0470	0.9795

Table 7. Reliability measurements

		Customer	Environment	Management	Saving E	Saving W
Segment 1 (48.25%)	AVE	0.339641	0.268672	0.296890	0.569210	0.504911
	Comp. Reliab.	0.621487	0.650976	0.161018	0.839004	0.800408
	R Square	0.019814		0.502612	0.495089	0.254883
Segment 2 (33.00%)	AVE	0.388506	0.292590	0.537804	0.657355	0.530606
	Comp. Reliab.	0.478328	0.689676	0.809012	0.884620	0.802475
	R Square	0.397002		0.946842	0.766792	0.798977
Segment 3 (18.75%)	AVE	0.585137	0.479320	0.576376	0.420720	0.516375
	Comp. Reliab.	0.845124	0.831121	0.844457	0.737778	0.576635
	R Square	0.001608		0.880982	0.688768	0.523428

Table 8. Disaggregate results for direct effects between latent variables

Hypothesis	Global (T-statistic)	Segment 1 (48.25%) (T-statistic)	Segment 2 (33.00%) (T-statistic)	Segment 3 (18.75%) (T-statistic)
H1	-0.3759 (2.2146)	0.1408 (0.9273)	-0.6301 (50.8752)	0.0401 (0.3736)
H2.1	0.3903 (9.4509)	0.3867 (4.1452)	0.6319 (30.5276)	0.1817 (4.5894)
H2.2	-0.3399 (3.7670)	0.2747 (3.7218)	-0.3490 (18.0029)	-0.7076 (16.4912)
H3.1	0.7952 (12.8167)	0.6738 (7.9088)	0.6992 (23.3502)	0.7908 (41.5932)
H3.2	0.0337 (0.3410)	0.1288 (0.8166)	-0.2465 (8.7005)	-0.2854 (3.8749)
H4.1	-0.3030 (2.7164)	-0.2330 (3.4739)	-0.1937 (6.3971)	0.0831 (0.3578)
H4.2	-0.4464 (7.4040)	-0.0135 (0.1263)	-0.8428 (35.6918)	-0.1152 (4.1961)
H4.3	0.3609 (7.2898)	0.0685 (0.9107)	0.9087 (32.4577)	0.8136 (3.7031)
H4.4	0.2845 (2.4602)	-0.5708 (4.6183)	-0.7215 (28.7478)	0.0668 (0.1702)
Goodness of Fit	0.4412	0.4422	0.7301	0.6338

CONCLUSION

This paper aims to analyze the integration of environment in management of rural tourism entrepreneurs. Through a questionnaire, we have put into operation five latent factors related to the environmental perception of the entrepreneurs, and we have estimated, by PLS, a model that reproduce the relationships between its. Eight of the nine proposed hypothesis has been confirmed by the empirical evidence, showing the importance of the environmental issues on business management in rural tourism. But the entrepreneurial response to these issues isn't the same. To identification the differences that characterize the three uncovered entrepreneurs segments, we

conducted an ex post analysis and we reviewed several potential explanatory variables (Ramaswamy *et al.*, 1993).

The first segment (48.25%) is composed mostly by entrepreneurs whose environmental concern primarily influences both saving factors, whereas it directs effect on management and customer factor is moderate. It is a type of entrepreneur whose environmental sensitivity leads to saving decisions and whose business management strategy is focused on an efficient use of the resources, especially the energy ones. For him, the environmental sustainability of your firm is to manage resources efficiently and

minimize both their costs and their environmental impact. It is the “*environmentally conscious entrepreneur*”.

The entrepreneurs of the second segment (33%) show an environmental awareness that pervades their entire management strategy. Not only saving factors, but the customer variable and the managerial factor ($R^2 = 0.947$) are highly dependent on environmental concern. These entrepreneurs focus their activities on customers seeking environmentally sustainable tourism and value the entrepreneurial efforts to achieve that goal. Like the first group, they manage energy resources efficiently but, also, they design their business management from an ecological standpoint. For them, the environmental approach is a business opportunity and a source of competitiveness. They are the “*green entrepreneurs*” or “*ecopreneurs*”.

Finally, the last segment (18.75%) is composed by entrepreneurs whose environmental concern influences solely on energy saving variable. Its environmental motivations unrelated to their customers ones and the management strategy isn't sensible to them: their actions aren't related with the environmental sustainability, but with the acquisition of customers and short term profits. They are the “*environmental reactive entrepreneurs*”.

In summary, the entrepreneurial response to environmental issues is different. While environmental awareness is present in all rural tourism entrepreneurs, the degree of integration into the management is different: entrepreneurs that only responding to customer demands, other that only included the efficient management resources to minimize the environmental impact of their business, and ecopreneurs, that planning the entire management to achieving the environmental sustainability of their economic activities.

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