

# TOWARDS A BETTER UNDERSTANDING OF ECO-INNOVATION DEVELOPMENT: AN EMPIRICAL ANALYSIS OF THE SPANISH HOSPITALITY INDUSTRY

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## Abstract

*This study examines the determinants of the environmental orientation of hospitality firms while innovating. Using structural equation modeling and data from the Spanish Technological Innovation Panel, we report how firms' environmental orientation is positively affected by the type of innovation that they develop and the positive relation existing between the market and institutional information sources and the environmental orientation. Finally, we propose and validate a model that explains these relations. The study concludes with a discussion of the implications of these findings for future hospitality environmental orientation development.*

## 1 Introduction

Environmental orientation integrates strategic aspects and objectives. Different studies have focused on identifying the aspects that need to be managed to boost companies' environmental orientation.<sup>1</sup> The industry characteristics,<sup>2</sup> external pressure,<sup>3</sup> corporate and marketing strategies,<sup>4,5</sup> environmental policies<sup>6</sup> or implementation of environmental management systems<sup>7</sup> are among these factors.

In previous studies, we have shown that process orientation and product orientation when innovating in service companies are correlated with greater environmental awareness and eco-innovative activities.<sup>8</sup> Moreover, perceived factors, including benefits and cost savings, are important to innovation adoption in organizations. However, differences between different services might appear, such as those between services and industries or concerning other characteristics, such as the technological level of the firm. The relative impact of these drivers on the environmental orientation might justify a different action plan to promote environmental orientation in a specific service. This study is the first approach to

evaluate whether the drivers of the environmental orientation detected in previous studies exist in the hospitality industry.

Therefore, we can expect that process-oriented companies, understood as those companies that are oriented towards reducing their costs and increasing their capacity and flexibility,<sup>9</sup> are simultaneously seeking to reduce their impact and improve their environmental performance, that is, to be environmentally oriented. We state the first hypothesis as follows:

H1: Process orientation has a positive effect on the environmental orientation of hospitality firms while innovating.

Several studies relating competitiveness improvement and differentiation indicate that environmental awareness should be considered as an opportunity.<sup>10</sup> Green products and services represent a vast and increasing market to be tapped into and should not be dismissed. If we define product-oriented companies as those that focus on increasing the quality or the number of services and on penetrating new markets or increasing their market share, we can expect them to be environmentally oriented, as they will try to reach green customers.

H2: Product orientation has a positive effect on the environmental orientation of hospitality firms while innovating.

Companies' environment conditions their behavior. Thus, we can expect competitors, clients and suppliers' attitudes towards environmental aspects to affect firms' environmental orientation. Consequently, firms that consider the information from their competitive environment (clients, competitors and suppliers) to be important will be more sensible to market demands, that is, reducing their water, energy and waste consumption or increasing their operational efficiency (process orientation), and to the "green" demand (product orientation). Consequently, we hypothesize that:

H3: The importance of market information sources in the innovation process positively affects the product orientation of hospitality firms.

H4: The importance of market information sources in the innovation process positively affects the process orientation of hospitality firms.

Finally, we would expect universities and technological centers (institutional information sources) to be more aware of the environmental aspects. Similarly, technical expositions and conferences and technical and scientific journals are at the forefront of the new environmental developments and innovations. Companies that

rely on this information for their innovation process should be more prone to introducing environmental novelties into their products or processes. Therefore, we hypothesize:

H5: The importance of institutional and technical information sources in the innovation process positively affects the process orientation of hospitality firms.

H6: The importance of institutional and technical information sources in the innovation process positively affects the product orientation of hospitality firms.

## 2 Methodology

For this study, we used the Technological Innovation Panel (PITEC). The PITEC is a survey of innovation activity in Spanish enterprises. We used data from the 2010 survey and the variable ACTIN, which classifies companies into economic activities, to retrieve data for 41 firms within the hospitality industry. We disregarded those cases with a lack of data relating to the variables that we used in the study (see table 1).

**Table 1:** Selected variables from the PITEC database

PITEC Variables	Explanation
FUENTE <sub>i</sub> (i=1,...,10)	Importance of information sources while innovating (internal sources, suppliers, clients, competitors, consultants, universities, government or public research institutions, conferences, scientific journals and professional or industrial associations)
OBJET <sub>i</sub> (I=1,...,10, 12)	Importance of some objectives (increase the range of products or services, replace outdated products or processes, enter new markets, increase the market share, improve the quality, increase the flexibility, increase the capacity, reduce the labor costs, reduce the material cost per unit, reduce the energy costs per unit, reduce the environmental impacts, improve health or safety, meet environmental and H&S regulations) while innovating

Categorical variables: 1=high; 2=medium; 3=low; 4=not considered or not important.

We used a partial least squares (PLS) approach with SmartPLS 2.0.M3 by Ringle et al.<sup>11</sup> to analyze the data. PLS is appropriate for exploratory purposes in small samples, with no presupposition of normality in the variables, and to predict the effects of some variables on others. Moreover, this method evaluates the reliability and validity of the instrument simultaneously.

We used item reliability, internal consistency and discriminant validity<sup>11</sup> to test the reliability and validity of the research instrument. First, we used individual item

loadings to evaluate the individual item reliability. According to Chin,<sup>11</sup> individual items with loadings greater than 0.7 are considered to be acceptable. Second, we used Cronbach's alpha and composite reliability to evaluate the internal consistency for each construct. The minimum acceptable alpha or composite reliability level is 0.7 for each item loading.<sup>12</sup> Finally, we tested the discriminant validity using the average variance extracted (AVE) and the squared intercorrelations among the latent variables. The AVE should be greater than 0.5 and the squared intercorrelations should not exceed the AVE.<sup>11, 13</sup> The results in tables 2 and 3 show values that meet the suggested thresholds, indicating that the measurement model was assessed with confidence.

**Table 2:** Reliability measurements

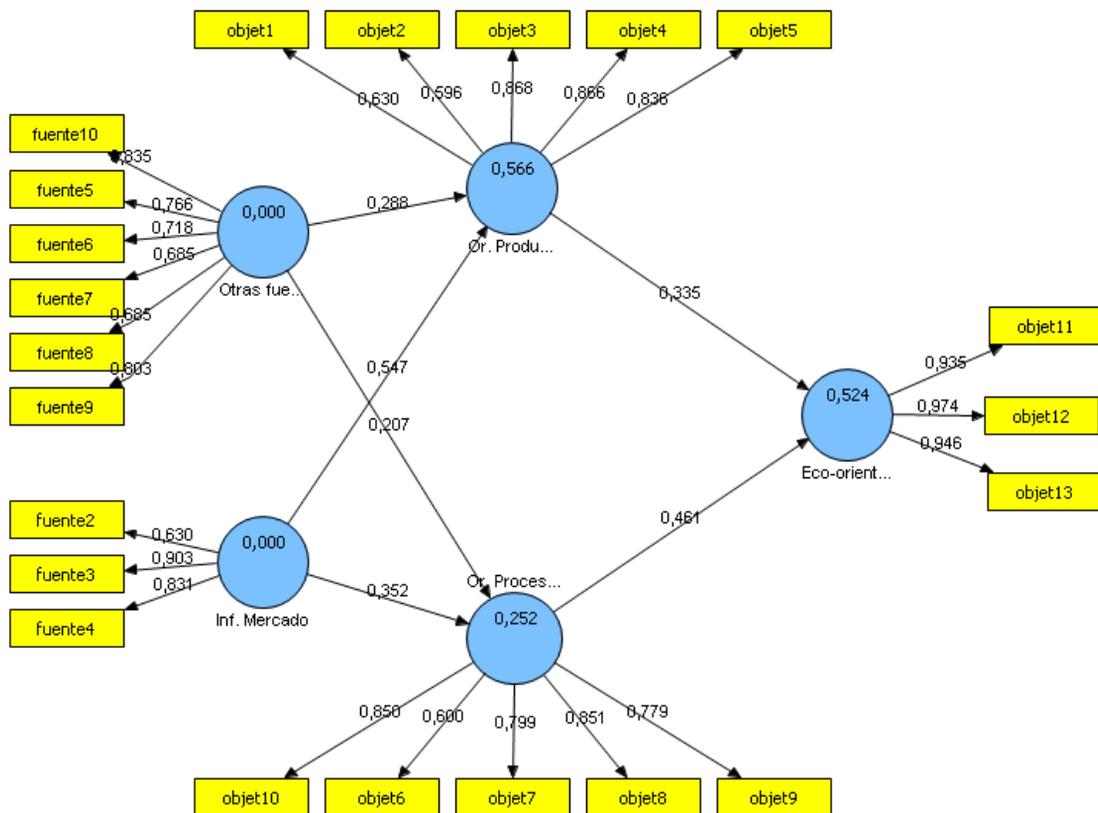
	AVE	Composite Reliability	R Square	Cronbach's Alpha	Communality	Redundancy
Eco-orientation	0.906	0.967	0.524	0.948	0.906	0.372
Market Inf. Sources	0.634	0.836		0.711	0.634	
Process Orientation	0.610	0.885	0.252	0.837	0.610	0.127
Product Orientation	0.591	0.876	0.566	0.820	0.591	0.284
Other Inf. Sources	0.564	0.885		0.861	0.564	

**Table 3:** Matrix of correlation between latent variables

	Eco-orientation	Market Inf. Sources	Process Orientation	Product Orientation	Other Inf. Sources
Eco-orientation	<b>0.952</b>				
Market Inf. Sources	0.397	<b>0.796</b>			
Process Orientation	0.677	0.473	<b>0.781</b>		
Product Orientation	0.632	0.715	0.644	<b>0.768</b>	
Other Inf. Sources	0.556	0.582	0.412	0.606	<b>0.751</b>

Note: Square root of the AVE on diagonals in bold.

Figure 1 presents the results of the structural model proposed. Observable questionnaire items from the PITEC database are shown in rectangles and unobservable latent factors with circles. The arrows indicate regression relationships, showing the relationships of items with latent factors (measurement model) and between latent factors (structural model). Corresponding partial regression coefficients are indicated next to the arrows and, inside the circles corresponding to the endogenous variables, the coefficient of determination ( $R^2$ ) for the corresponding regression is shown.



**Figure 1:** Estimated structural equation model

We tested the significance of the relationships (path coefficients) by estimating their t-statistics and p-values using the bootstrapping approach with 5000 samples (see table 4). All the proposed relations appear to be significant. More specifically, process orientation ( $\beta=0.461$ ,  $p<0.001$ ) and product orientation ( $\beta=0.335$ ,  $p<0.01$ ) have a positive effect on eco-orientation. The importance of the information from suppliers, competitors and clients in the innovation process (market information sources) has a significantly positive effect on the product orientation ( $\beta=0.547$ ,  $p<0.001$ ) and process orientation ( $\beta=0.352$ ,  $p<0.001$ ) of the hospitality firms while innovating. Finally, other information sources are also significantly related to process and product orientation ( $\beta=0.207$ ,  $p<0.05$ ;  $\beta=0.207$ ,  $p<0.05$ , respectively).

**Table 4:** Tests of the hypotheses for direct effects between latent variables

	Mean	Standard Error	T Statistics
H1: Process Orientation -> Eco-orientation	0.461	0.114	4.058***
H2: Product Orientation -> Eco-orientation	0.335	0.115	2.908**
H3: Market Inf. Sources -> Product Orientation	0.547	0.063	8.701***
H4: Market Inf. Sources -> Process Orientation	0.352	0.096	3.657***
H5: Other Inf. Sources -> Process Orientation	0.207	0.092	2.26*
H6: Other Inf. Sources -> Product Orientation	0.288	0.065	4.441***

\*\*\* Significant at  $p < 0.001$ , \*\* significant at  $p < 0.01$

In addition, the  $R^2$  values for each endogenous variable, which measure the percentage of variance explained by each construct in the model, are remarkable. The importance of the information sources in firms' innovation explains 56.6% of the variance in product orientation and 25.2% in process orientation. On the other hand, product orientation and process orientation explain 52.5% of the variance in the eco-orientation of the hospitality firms.

Finally, we strengthened the analysis with the cross-validated redundancy index ( $Q^2$ ) or the Stone–Geisser test, which gives us a measure of the predictive relevance of the model.<sup>14</sup> Table 5 shows the Stone–Geisser test ( $Q^2$ ) utilizing the blindfolding procedure. The results show that the model has predicted relevance, as the  $Q^2$  results for each construct are greater than zero.<sup>14</sup>

**Table 4:**  $Q^2$  results for each construct

	1-SSE/SSO
Eco-orientation	0.474
Process Orientation	0.137
Product Orientation	0.279

## 4 Conclusions

The purpose of this study was to identify some determinants of the environmental orientation of hospitality firms while innovating. Specifically, this research proposed product and process orientation and the importance of market and other information sources as the key factors determining eco-orientation. Using PLS structural equation modeling, we confirmed the measurement model's reliability and validity. Further, the structural model demonstrated that all of the path coefficients were statistically significant and directionally supported.

The evidence supports the idea that companies in the hospitality industry that seek greater flexibility, to increase their services and to reduce the costs (labor, materials and energy) per service when innovating (process orientation), have a greater environmental orientation. Moreover, hospitality organizations tend to be more environmentally oriented if, in the innovation process, they are orientated towards increasing the quality or the number of services penetrating new markets or increasing their market share.

The study highlights that hospitality organizations that rely on information from suppliers, competitors and clients (market information sources) or information from other sources, such as universities, technology centers and public institutions, in the innovation process are more likely to orientate their innovation towards the product or the processes. Consequently, this relation will also affect the environmental orientation of the innovation process.

The research model provides a framework for understanding why some organizations may or may not be environmentally oriented while innovating. Rather than focusing on firms' characteristics, like size, export orientation or technological level, which have been proved to influence firms' eco-orientation, our model assessed innovative characteristics, such as product and process orientation and the importance of the market and other information sources in the innovation process.

However, limitations to the study exist. The sample size and the generalizability of this study are strong limitations that suggest increasing the sample by expanding the research to include organizations representing other countries and specific hospitality contexts. The latter should help academics to uncover industry-specific relationships that remained undetermined in this study.

In addition, this study did not investigate the effects of external variables that can influence environmental orientation, such as legislation changes or consumer behavior regarding environmental products or labels. Therefore, other variables may affect the environmental orientation of the hospitality industry. Future research needs to be conducted to examine the effects of external variables or potential moderating effects of the financial resources available or the firm size.

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